



FINAL
Preliminary Assessment
PCBs in Old Well at Lake George Work Center

Pike-San Isabel National Forests

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ACRONYMS

2,4-D	2,4-dichlorophenoxyacetic acid
amsl	above mean sea level
AST	Aboveground Storage Tank
B2P	bis (2-ethylhexyl) phthalate
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylene
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CGS	Colorado Geological Survey
CUSP	Coalition of the Upper South Platte
CVOCs	chlorinated volatile organic compounds
CY	cubic yards
DADS	Waste Management RCRA Subtitle D facility in Denver
DVD	Digital Versatile Disk
EDB	ethylene dibromide
EOX	extractable organic halogens
ESC	Environmental Science Corporation
GAC	granular activated carbon filtration system
gpm	gallons per minute
HRS	Hazard Ranking System
ID	inside-diameter
IREA	Intermountain Rural Electrical Association
L/kg	liters per kilogram
MCL	Maximum Contaminant Level
MES	Management and Engineering Services, L.L.C.
MEK	methyl ethyl ketone
MSE	Millennium Science and Engineering
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MS/MSD	Matrix Spike/Spike Duplicate
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbons
PA/SI	Preliminary Assessment/Site Inspection
PCB	poly chlorinated byphenyls
PCE	tetrachloroethene
PCP	pentachlorophenol
PRP	Potentially Responsible Parties
PSICC	Pike, San Isabel National Forests and Cimarron, Comanche National Grasslands
PVC	polyvinyl chloride
RBSL	Colorado Risk Based Screening Level



RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SAIC	Science Applications International Corporation
SI	Site Inspection
SVOC	Semi-volatile organic compounds
SW	Solid Waste Method
TD	total depth
TPH-DRO	total petroleum hydrocarbons-diesel range organics
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
URS	United Research Services
UST	Underground Storage Tank
UTS	Universal Treatment Standard
VOC	Volatile Organic Compounds



1 INTRODUCTION

This Preliminary Assessment (PA) was conducted at the United States Department of Agriculture, Forest Service (USFS) Lake George Work Center (WC; “the Site”), located in Park County, Lake George, Colorado. The Lake George WC address is Highway 24, Lake George, Park County, Colorado 80827. This PA was prepared for the USFS Rocky Mountain Region (Region 2), with on-scene coordination performed by the Pike, San Isabel National Forests and Cimarron, Comanche National Grasslands (PSICC). Applied Intellect LLC (AI) authored this PA Report in accordance with Contract GS-10F-026BA, Task Order AG-82X9-D-16-0008 with the USFS Region 2. This PA was conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) under the authority of the USFS as the Lead Federal Agency, with the United States Environmental Protection Agency (USEPA) and State of Colorado (State) providing regulatory consultation (Lead Regulatory Agencies). The PA was performed in general accordance with the USEPA publication *Guidance for Performing Preliminary Assessments Under CERCLA* (USEPA, 1992).

The EPA ID Number for the Site is CON000802500.

1.1 Background

The Site has been in service since the 1930’s for maintenance activities associated with the USFS activities in the Pike-San Isabel National Forests, and is currently a focal point for fire-fighting in these Forests. The Old Well, located approximately 50 ft east of the Ranger living quarters, was a previous source of drinking and industrial water before radium was measured in samples from the well at concentrations above drinking water standards. In 2011, water samples from the Old Well were analyzed again, and Aroclor 1254 was detected at 4.9 micrograms per liter ($\mu\text{g/L}$), which exceeds the USEPA drinking water Maximum Contaminant Limit (MCL) of 0.5 $\mu\text{g/L}$ (<http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=140&tid=26>). Water samples have been collected periodically since 2011, and Aroclor 1254 results have generally exceeded the MCL.

In 2014, the USFS conducted a treatability study to determine if contaminated sediments and groundwater could be removed from the environment by conducting a pumping activity in which sediments from the bottom of the well were removed from the Old Well sump. Approximately six inches of sediments and 13,455 gallons of groundwater were pumped from the Old Well, much more than the well volume of less than 200 gallons. Aroclor 1254 was not detected in water samples immediately after the pumping event, but concentrations appeared to rebound in subsequent events, including an Aroclor 1245 water result of 520 $\mu\text{g/L}$ collected on December 14, 2015 from the Old Well. Although this result exceeded the solubility limit of Aroclor 1254 in water [43 $\mu\text{g/L}$ (USEPA RSLs May 2016)] and may be the result of contaminated sediments entrained in the water sample, it indicated that Aroclor 1254 remained in the system.

In March 2016, the USEPA, sampled wells near the Old Well, including three offsite private supply wells and three onsite monitoring wells. The results confirmed the theoretical



assessment that Aroclor 1254 would not travel in groundwater, due to its low solubility and its high affinity to adsorb to soil particles immediately surrounding the well.

In June 2017, the USEPA provided approval to the USFS to abandon the Old Well in accordance with 40 CFR 761.61(c) *Risk-based disposal approval*.

On July 6 and 7, 2017, contractors for the USFS abandoned the Old Well by grouting through the screened interval (from 156 ft bgs to 49 ft bgs) and filling the remainder of the casing with hydrated bentonite chips, thus eliminating any current and future migration pathways and exposure routes to PCBs detected in the Old Well sediments.



2 PURPOSE

The purpose of this PA is to evaluate PCBs detected in surface debris of the former Old Well vault, and in water from the Old Well to assess the immediate or potential threat these chemicals pose to human health and the environment. This is required in accordance with CERCLA due to the release of a CERCLA hazardous substance. This PA report supports the evaluation and qualitative assessment of the threat to human health and the environment through:

- Conducting a record search of potential sources of PCBs observed in debris and groundwater associated with the impacted USFS Site Old Well.
- Conducting a site visit and interviews with stakeholders familiar with historical activities that may have resulted in PCB releases to the environment, both onsite and in adjacent land use areas.
- Evaluating results from previous investigations to determine if there is a threat to human health and the environment, and if data gaps exist that are necessary to be filled before a cleanup action, if required, is conducted.
- Presenting recommendations for either no further action, additional sampling in the form of a CERCLA Site Inspection (SI), or an immediate removal action.

2.1 Characteristics of Polychlorinated Biphenyls

This PA is the result of observations of Aroclor 1254 (also known as PCB 1254) detected in water and debris associated with a former groundwater supply well (known hereafter as the Old Well) within the Site facility.

According to the Agency for Toxic Substances and Disease Registry (ATSDR 2000), PCBs are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no identifiable smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor. PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

PCBs enter the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs. PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators. PCBs do not readily break down in the environment and persist for very long periods of time. PCBs can travel long distances in



the air and be deposited in areas far away from where they were released. In water, small amounts of PCBs may remain dissolved, but most adsorb to organic particles and bottom sediments. PCBs also bind strongly to soil and clays.

In general, PCBs are relatively insoluble in water, and the solubility decreases with increased chlorination. PCBs are also freely soluble in nonpolar organic solvents and biological lipids (USEPA 1980). PCBs are combustible liquids, and the products of combustion may be more hazardous than the material itself. By-products of combustion include hydrogen chloride, polychlorinated dibenzodioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) (NFPA 1994).

According to the USEPA Regional Screening Level (RSL) Parameters Table (USEPA 2016), the following physicochemical properties characterize Aroclor 1254 (Chemical Abstract Service [CAS] number 11097-69-1):

- Molecular Weight – 3.3×10^2 ;
- Density – 1.5 grams per centimeter³ (g/cm³);
- Soil Partitioning Coefficient – 1.3×10^5 liters per kilogram (L/kg); and
- Solubility in water – 4.3×10^{-2} milligrams per liter (mg/L).



3 SITE VISIT AND INTERVIEWS

On March 30, 2016, a site visit was conducted by Mr. Jeff Hart (AI), Ms. Hilary Williams (AI), and Mr. Todd Knoedler (USFS On-Scene Coordinator, Pike National Forest). The initial site visit was conducted to review locations of previous investigations, identify existing groundwater monitoring wells for future sampling, evaluate potential contaminant migration pathways and visually assess other potential sources of PCBs in the immediate vicinity of the Site.

Mr. Knoedler identified the submersible pump that was removed from the Old Well in 2014 as Model Sta-Rite 10GPM, 220V, Code 10SP4DO2H, date of manufacture May 2008. Although, the probable source of the PCBs in the Old Well is from an undocumented oil-cooled pump manufactured between 1960 and 1978 (USEPA March 2016 meeting with the USFS), none of the current USFS employees could provide any information describing the pumps used prior to 2000.

The Team did not observe any transformers near the Work Center, or any areas that show signs of stained soil from chemical releases. The Team did observe two small areas (approximately 30 ft in diameter) east of the Barrel Rack removal area where debris had been burned on the ground surface recently, with evidence of charcoaled wood and metal debris remaining on the ground surface.

The Team visited:

- The Old Well in which PCBs were detected in groundwater; and LGMW1, LGMW2, LGMW3, shallow monitoring wells installed by a USFS contractor in 2014;
- The Barrel Rack Removal Area and noted that all groundwater wells installed in 2003, and sampled by SAIC in 2004 (H-7A, H-13, H-14, H-15, and H-17) have been abandoned and are not available for sampling;
- Water treatment shed (GAC filtration and chlorination) east of the Barrel Rack Area, and refuse burn areas located between the Barrel Rack Area and the water treatment shed;
- The spring box water source that is located just east of the water treatment shed, which was the Site water source until it began to provide unsatisfactory yield in 2011;
- The current Site water source, USFS Well (permit number 288032), perforated between 110 and 305 ft bgs in granitic bedrock, with a yield of 2 gallons per minute (gpm); and
- The Former Lake George Landfill is located on USFS land, approximately 2,500 ft north of the Site with monitoring wells LG-1, LG-2, LG-3 and LG-4 still available for sampling.

During the site visit, Jerry Thompson (a USFS employee) remembered that a temporary pole-mounted transformer had been installed in 2004, but was only onsite for a couple of months. He did not recall any utility storage yards where transformers may have been stored in Lake George since 2004 and no pole-mounted units were currently observed.



The Team visited the Coalition of the Upper South Platte (CUSP), a community-based coalition of stakeholders whose mission is to protect the Upper South Platte watershed. CUSP formed a charitable non-profit organization in 1998, currently located in Lake George, Colorado. CUSP was identified by the USFS as a source of information regarding potentially polluting activities near Lake George. CUSP was visited and interviewed by phone and supplied the following information:

- The Intermountain Rural Electric Association (IREA) may have had a small storage facility located on the ridge located approximately 3,000 ft northeast of the Site. IREA disputed that in a phone interview.
- An abandoned quarry that has been used as an unregulated dump may exist approximately 3,800 ft north of the Site and approximately 1,500 ft east of the Lake George Landfill.



4 Environmental Setting

4.1 Site Description

4.1.1 USFS Lake George Work Center

The Site is located on the southeast edge of the town of Lake George, Colorado, at 140 Trail Creek Road (County Highway 94) at latitude 38°58'44.89"N, longitude 105°21'10.49"W (WGS84), (legal description: the southwest quarter of the northeast quarter of section 29, township 12, south, range 71 west, Park County, Colorado). The town of Lake George is located approximately 31 miles northwest of Colorado Springs along the South Fork of the South Platte River (Figure 4-1). The Lake George reservoir is part of the South Platte River. Lake George is a small reservoir, with a surface area of approximately 60 acres, constructed on the South Fork of the South Platte River. The lake is located directly west of the town of Lake George and the Site (Figure 4-2).

The Site has been used as a maintenance center and storage yard for approximately 60 years. Domestic water for the Site is provided by an onsite well and a spring located in a draw east of the Site (Figure 4-5). The current well and spring box was constructed following the removal of the Old Well from the potable water system. Sanitary waste is disposed of in two on-site septic tank/leach field systems. Underground utilities, (water supply lines, septic tank and leach field systems, and USFS electric lines) are primarily located in the western portions of the Site (Figure 4-3). The access road for the Site passes around the north side of the main buildings, travels through the storage area, and continues up the small draw to the east of the Work Center.

The Site currently consists of a set of four main buildings, six small storage sheds located to the northeast of the main buildings, a trailer house, a prefabricated house, a fenced storage yard, and an open storage area (Figure 4-3). A former explosives storage area is located east of the other open storage areas. Open storage areas present at the Site contain products used by the USFS to perform its activities, including timber, boards, metal items, trash cans, culverts, and various other items. Chemicals used by the USFS at the Site include: gasoline, diesel fuel, kerosene, ethylene dibromide (used to control the Pine Bark Beetle), creosote and pentachlorophenol (used for wood treatment), other herbicides and pesticides, and various paints and stains.

The Old Well is located at the Site, approximately 200 ft east of Highway 94, adjacent to the old ranger residence. The Old Well was in a frost vault, approximately 4 ft deep and 4 ft square at the bottom, with a cement floor. In 2014, the Old Well was extended to approximately 2 ft above ground surface, and the frost vault was filled in. A power box is located just south of the well to run the electrical pump. The Old Well is an unpermitted well that was used to supply potable water to the Work Center until radium was measured in the water in the 1990s. After radium was detected in the Old Well, water was taken from a spring box located east of the facility until its capacity diminished in 2011, and the Old Well was tested in July 2011 to determine if it could be used. Aroclor 1254 was detected in the well sample from the July 2011



sampling event. An electrical submersible pump remained in the well, capable of drawing groundwater from 138 ft bgs, until it was removed in 2013 (Todd Knoedler, Private communication).

4.1.2 Lake George Landfill

The Lake George Landfill is located approximately 0.4 miles north-northeast of the town, adjacent to Trail Creek Road at an elevation of 8,180 ft on USFS land. The Lake George Landfill is located approximately 2,500 feet north of the Site, north of the junction of Trail Creek Road and Highway 24. The USFS reports that the landfill was used by the town of Lake George from the 1950s until the mid-1960s. In the late 1960s, the landfill was closed and the surface reclaimed into a meadow. In the 1990s, a USFS law enforcement pistol range was constructed at the upper end of the valley where the landfill is located. A map showing the Lake George landfill and vicinity feature is provided as Figure 4-4.

4.2 Environmental Setting

4.2.1 Geologic History

The town of Lake George is located near the northern end of an ancient lakebed that was formed during the Oligocene Epoch, 29 to 37 million years ago. Previously, a series of southeast-trending streams drained across Precambrian age intrusive granites (Hutchinson, 1988), from the current South Park area. The streams flowed across a relatively level, low relief plain joining the current Arkansas River somewhere near Canon City.

During the late Eocene, 37 to 43 million years ago, two major drainages existed in the Lake George area (Epis, et al., 1976). The first drainage was located west of the current location of Currant Creek. The second drainage flowed through the Florissant-Lake George area, turning south approximately along the current location of Fourmile Creek.

Beginning about 35 million years ago, a series of volcanic events occurred, starting with the explosive extrusion of the Wall Mountain tuff from a source located near Salida, Colorado (Epis, et al., 1980). Approximately 34 million years ago, the Thirtynine Mile volcanic center, located near the present town of Guffey, became active. The Thirtynine Mile Andesite erupted from numerous local vents and spread across much of the area between Florissant and the Arkansas River. The flows created a series of shallow basins along their northern margins. These basins filled with water and created a series of lakes that filled with fine-grained sediments, including clay, silt, and sand, along with fine volcanic ash. During Miocene time, from 5 to 29 million years ago, major block faulting and uplift of the general region began and continued into the Pliocene (1 to 5 million years ago), at which time the rate of uplift increased. The Pliocene uplift resulted in down-cutting by the surface drainages and exposure of fine-grained sediments in the area (Desborough, 1982). More significantly, the uplift produced deep incised canyons on the margins of the uplift.



The valley where the Lake George landfill is located has a northwest trend that parallels the major Lake George valley graben. This strike matches the general trend of this valley and can be traced as a linear feature from Trail Creek Road on the south, northward across the landfill valley, across the low ridge to the north and then down a narrow northwest trending valley beyond that. Fracturing and joints found in the northeast trending valley in which Trail Creek Road is located indicate that this valley is controlled by a northeast-trending fault. This fault appears to terminate the northwest-trending landfill valley fault at their intersection. The intersection between the two faults is characterized by an abrupt change in stream flow direction and an abundance of willows that is indicative of shallow groundwater.

4.2.2 Hydrogeology

The town of Lake George and the Site are located east of a down thrust block fault in the Precambrian granitic basement rock. Fine-grained alluvial and colluvial deposits have filled the basin to depths greater than 300 ft in some locations, and they form the main water-bearing aquifers that are the source of potable water for the residents and businesses in the town of Lake George. According to the Colorado Division of Water Resources (CDWR), the total depth of water supply wells in the study area range from 30 ft bgs to 500 ft bgs (Lake George Charter School well), with the main water-bearing aquifers located in the alluvial sediments. Bore logs from the CDWR indicate shale or mudstone dominate the alluvial sediment with water-bearing zones found in fractured shale or sandstone layers between 50 and 120 ft bgs (See Appendix D). These water-bearing zones consist of coarser-grained material or fracture zones and are confined by the finer-grained sediments above and below them.

Many of the wells located in the study area are screened in the alluvial sediments. Selected alluvial wells are described below (Figure 4-5).

- Well number 200953, located approximately 800 ft north-northwest of the Old Well, was completed at a total depth of 125 ft bgs, with 0 to 3 ft bgs in topsoil, 3 to 51 ft bgs in grey shale, 51 to 53 ft bgs in fractured material, 53 to 125 ft bgs in black shale with fractured material between 95 and 97 ft bgs. Water was produced in the fractured zone between 51 and 53 ft bgs and between 95 and 97 ft bgs. This well produced 15 gpm when installed. Following drilling activities, groundwater rose to approximately 33 ft bgs indicating the presence of a confining layer.
- Well number 204228, located approximately 650 ft west of the Old Well, was completed at a total depth of 100 ft bgs, with 0 to 60 ft bgs in brown clay, 60 to 80 ft bgs in tan clay shale and 80 to 100 ft bgs in blue shale. Water was produced in the fractured zone below 80 ft bgs. This well produced 10 gpm when installed. Following drilling activities, groundwater rose to approximately 28 ft indicating a confining layer.
- Well number 187283B, located approximately 1,600 ft northwest of the Old Well, was completed at a total depth of 150 ft bgs, with 0 to 23 ft bgs in weathered granitic sand/gravel, 23 to 65 ft bgs in shale, 65 to 70 ft in fractured shale, and 70 to 150 ft bgs in black shale. Water was produced in the fractured zone between 65 and 70 ft bgs. This



well produced 4.5 gpm when installed. Following drilling activities groundwater rose to approximately 22 ft bgs indicating a confining layer.

Three groundwater monitoring wells (LGMW01, LGMW02, and LGMW03) were installed by the USFS in April of 2014 (Abaci 2014a) within 100 ft of the Old Well, with screens in the upper water bearing strata (50 to 60 ft bgs) (Figure 4-3). Two of these wells were purged dry at less than 0.5 gpm, while LGMW2 provided a steady yield at 0.6 gpm during purging. In contrast, the Old Well was pumped steadily at 4.8 gpm for 26 hours during the removal action pilot study conducted in August of 2014. The significant difference in yield can be attributed to the assumed greater water-bearing casing perforation length of the Old Well, estimated to be from 86 to 156 ft bgs (AI well bore survey, September 2016). This indicates higher yielding water-bearing zones below the screened intervals of the three groundwater monitoring wells.

In addition, water level drawdown data were collected from LGMW01, LGMW02 and LGMW03 during the pump and treat removal action pilot study at the Old Well in August of 2014. The Old well was pumped continuously after 12:10 PM on August 18, 2014 to 3:10 PM on August 21, 2014. During this period:

- LGMW01 was drawn down a total of 3.87 ft;
- LGMW02 was drawn down a total of 2.86 ft; and
- LGMW03 was drawn down a total of 0.15 ft.

This qualitatively indicates that LGMW03 is likely hydraulically isolated from the three other wells, while LGMW01 has the best hydraulic contact to the Old Well. This is significant when static water levels are compared at the three monitoring wells: static water elevation is consistently lower in LGMW03 than the other two wells, but may not be an indication of flow in this direction. Rather it may indicate that LGMW03 is hydraulically isolated, in a less permeable water bearing zone. For this reason, it is inappropriate to assume the gradient measured by the static water levels in these wells is an indication of groundwater flow.

Water is also found in the Precambrian granite, located in fractures that develop preferential pathways. The USFS installed a groundwater supply well east of the Site in 2012, within the granitic aquifer, perforated between 110 ft bgs and 305 ft bgs with a capacity of 2 gpm. Several other supply wells in the study area completed in the underlying Precambrian granitic basement rock are described below (Figure 4-5).

- The USFS well 1300 (permit number 288032), located approximately 1,470 ft east of the Old Well was completed at a total depth of 305 ft bgs, with 0 to 73 ft bgs in sand and clay and 73 to 305 ft bgs in granite. Water was produced at the bedrock interface at 73 ft bgs, and within granite fracture zones at 130 ft bgs, 150 ft bgs, and 180 ft bgs. This well produced 2 gpm when installed. Groundwater rose to 17 ft bgs during drilling, indicating a confined aquifer.
- The Lake George Charter School well (permit number 75827-F), located approximately 900 ft south of the Old Well was completed at a total depth of 500 ft bgs, with 0 to 35 ft



bgs in clay and silt, 35 to 90 ft bgs in shale, and 95 to 500 ft bgs in granite. The log did not indicate where water was produced during drilling. This well produced 4 gpm when installed.

- The Park County municipal well (permit number 144964-A), located approximately 2,700 ft southwest of the Old Well was completed at a total depth of 400 ft bgs, with 0 to 7 ft bgs in topsoil, 7 to 278 ft bgs in shale/mudstone, 278 to 306 ft bgs in shale with gravel, and 306 to 400 ft bgs in granite. Water was located at 86 ft bgs, 278 ft bgs and 306 ft bgs. This well produced 3 gpm when installed. Groundwater rose to 81 ft bgs during drilling.

4.2.3 Hydrology

The Watershed Boundary Dataset (WBD) defines the areal extent of surface water drainage to a point, accounting for all land and surface areas. Hydrologic Units (HU) for the WBD establish a base-line drainage boundary framework, accounting for all land and surface areas. The United States Geological Survey (USGS) defined HUs throughout the US, using an 8-digit Hydrologic Unit Code (HUC) to identify the watershed. The Site is in HUC8 10190001, which is the Missouri Region, South Platte Headwaters Watershed. Figure 4-5a shows the flowlines of intermittent and ephemeral streams that flow southwest during spring snowmelt and during heavy rain events. Two such streams flow north, and south of the Site, and eventually enter the Lake George reservoir west of the facility.

Figure 4-5b, shows three small forest/shrub wetlands near the Site (one to the west and two to the east), along the intermittent streams described above. Wetlands are also shown along the shoreline of Lake George reservoir, where the two intermittent streams enter the reservoir. Data from Figure 4-6a and 4-6b was taken from the USGS National Map Viewer, Hydrography (<http://viewer.nationalmap.gov/viewer/nhd.html?p=nhd>).

4.2.4 Threatened and Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the US Fish and Wildlife Service (USFWS). Near the Site, there is the potential for 10 endangered, threatened, or proposed species to be present (USFWS 2016). This includes four birds (least tern, Mexican spotted owl, piping plover, and whooping crane), two fish (greenback cutthroat trout and pallid sturgeon), two mammals (Canada lynx and North American wolverine), one plant (western prairie fringed orchid), and one insect (uncompahgre fritillary butterfly). In addition, there are 26 migratory birds that are known to occur in this area (USFWS 2016). Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. No critical habitat for any listed threatened or endangered species was identified near the Site.



4.3 Previous Environmental Investigations, Lake George Work Center

4.3.1 Hazardous Waste Survey, Lively, 1992

In July 1992, Mr. Jim Lively of the USFS conducted a hazardous waste survey for various sites in the Pike and San Isabel National Forests, including the Site (Lively, 1992). The survey identified several areas of hazardous materials storage at the Site, including the oil and gas shed located behind the shop, a drum rack outside of the fenced lot behind the shop, several empty 55-gallon drums stored near the fenced area, and a 500-gallon aboveground storage tank (AST) (Figure 4-3). The AST was identified as an old "farmer" tank that had been empty for many years. According to Mr. Lively, at the time of the survey, two of the drums in the drum rack contained spigots and were leaking or dripping, though the historic contents were not known.

4.3.2 Hazardous Waste Survey, MES, 1999

Management and Engineering Services, L.L.C. (MES, 1999) performed a hazardous waste survey at the Site. The survey identified several areas of environmental concern and provided recommendations for hazardous waste management at the Site. The survey identified three areas of soil contamination: the used oil accumulation area, the area in front of the door of the flammable storage building, and the drum dock (drum rack) area (Figure 4-3). The MES report recommended that the soil in the used oil accumulation area and the drum rack area be sampled and appropriate remedial action taken.

4.3.3 Soil Sampling Event, Flaniken, May 2000

In May 2000, an independent consultant collected four soil samples at the Work Center (Flaniken, 2000). The samples were collected in the fire fuel storage area and the horizontal drum storage area (drum rack area). Two samples were collected at each location; one sample was collected at the ground surface (0 to 6 inches) and the other sample was collected three feet bgs. The samples were analyzed for selected metals (arsenic and lead); benzene, toluene, ethylbenzene, and xylene (BTEX), and extractable organic halogens (EOX). The analytical results for the soil samples collected are provided in Table 4-1. All the chemicals analyzed, except benzene and toluene, were identified in the samples collected at the Site. The highest contaminant concentration (10,600 milligrams per kilogram [mg/kg] EOX) was identified in surface soil collected in the drum storage area. EOX reports the amount of organic chlorine in the sample. The high organic concentration reported in surface soil is likely a result of spills and leaks of chlorinated herbicides [pentachlorophenol (PCP) and 2,4-dichlorophenoxyacetic acid (2,4-D)] and chlorinated solvents in this area. Based upon the sampling results, the USFS consultant recommended additional site characterization and indicated that a possible removal action may be warranted.



Table 4-1. Lake George Work Center Analytical Results, May 2000

Analyte/Location (Sample Depth)	Fire Fuel Storage Area (0-6 in.)	Fire Fuel Storage Area (3 ft.)	Horizontal Drum Storage (0-6 in.)	Horizontal Drum Storage (3 ft.)
Arsenic	4.9	2.9	2.5	1.5
Lead	70	40	60	30
Benzene	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	< 0.01	< 0.01	0.07	< 0.01
Total Xylenes	< 0.01	0.42	0.56	0.034
Extractable Organic Halogens	115	< 10	10,600	288

Analytes reported as mg/kg.

Source: Flaniken, Steven D., Letter to Mr. Al Pearson, USDA, Forest Service, transmitting the analytical results for soil samples collected at various locations in the Pike and San Isabel National Forest, June 3, 2000.

4.3.4 Hazardous Waste Disposal, May 2002

In May 2002, the USFS removed outdated chemicals from the Site. These included:

- Three 55-gallon drums containing a diesel fuel (70 to 80 percent) and pentachlorophenol (20 to 30 percent) mixture;
- Seven drums of waste paint related material;
- Twenty pounds of waste calcium hypochlorite (dry); and
- Five gallons of water/ethylene dibromide (EDB), also known as dibromoethane or 1,2-dibromoethane.

4.3.5 Site Characterization, Science Applications International Corporation (SAIC), April 2003 through April 2004

In 2003, SAIC conducted the Lake George Work Center Site Characterization, which included many of the requirements of a CERCLA Preliminary Assessment/Site Inspection (PA/SI). A site visit was conducted on April 2, 2003, to identify locations where hazardous substances and petroleum products may have been spilled or released to the environment and Mr. Wayne Baker (USFS employee working at the Site) was interviewed at that time. Surface soil samples were collected at the Barrel Rack and Storage Area. Three additional areas (Oil House, Loading Dock Area, and Outhouse Pit) were also chosen for subsurface sampling later based on the visit (Figure 4-3).

Subsurface soil sampling was conducted by SAIC on May 8 and 9, 2003, at the Barrel Rack and Storage Area, Oil House, Loading Dock Area, and Outhouse Pit, using hand augers and a truck-mounted drill rig. Results of both sampling events are described below.



All soil samples were analyzed for volatile organic compounds (VOCs) using EPA Method 8260, for semi-volatile organic compounds (SVOCs) using EPA Method 8270, for chlorinated herbicides using EPA Method 8151, and for total petroleum hydrocarbons-diesel range organics (TPH-DRO) using EPA Method 8015. PCBs were not analyzed during these sampling events.

4.3.5.1 Oil House

A small shed, 6 feet by 10 feet, commonly called the "Oil House" is located along the south side of the main site road (Figure 4-3). According to SAIC, the shed has been used to store fuel, lubricating oils, paints, and thinners. Herbicides, pesticides, and wood preservatives may have also been stored in small quantities. No soil samples were collected at this location during the initial site visit because the soil around the shed was still frozen; however, on May 9, 2003, a single subsurface boring (H-8) was excavated to 19 ft bgs with two subsurface soil samples collected at 5 to 6 ft bgs and 15 to 16 ft bgs. Benzoic acid, Acenaphthene and Dibenzofuran were detected at less than Federal and State action levels in these samples.

Based on visual observations and field instrument readings, SAIC recommended that approximately 9 in-place cubic yards (CY) of soil be excavated and properly disposed. Based on limited records, it is believed that this excavation was completed by URS in 2004.

4.3.5.2 Loading Dock Area

A loading dock was located approximately 30 feet east of the Oil House (Figure 4-3). The ground surface behind the retaining wall consisted of natural soils. A shed was located on a concrete pad on a portion of the flat area created by the dock wall. A small, fuel tank with a hand pump was located adjacent to the shed. No visible staining or stressed vegetation were observed in the area. No soil samples were collected at this location during the initial site visit because the soil around the shed was still frozen; however, on May 9, 2003, two subsurface borings (H-9 and H-10) were excavated to a maximum of 14 ft bgs with four subsurface soil samples collected between 5 and 14 ft bgs. Only TPH-DRO was detected at a maximum concentration of 29 mg/kg in H-9. SAIC recommended no further action at this area.

4.3.5.3 Above Ground Fuel Tank

During the April 2, 2003, site visit, a 550-gallon AST was present on the northeast side of the storage area (Figure 4-3). During the preliminary site visit, a 1.5-foot deep test hole was excavated and no petroleum hydrocarbon odors or staining were observed. No further action was conducted in this location.

4.3.5.4 Outhouse Pit

During the April 2, 2003, site visit, a small pit was located near the southeast corner of the 8-foot chain link fence that surrounds a storage yard (Figure 4-3). Based on the appearance, the pit is estimated to have originally been at least 5 feet deep. Examination of the materials in the



pit found no chemical odors, chemically stressed vegetation, or indications of environmental concerns. No further investigation was conducted in this location.

4.3.5.5 Barrel Rack and Storage Area

The barrel rack was located on the eastern portion of the Site within the open storage area (Figure 4-3). The rack was approximately 12 feet in length and was used to store and dispense chemicals from 55-gallon drums. In addition to the barrel rack, corrugated metal pipes, used tires, and wood debris was stored in the open storage area.

It is not known when the barrel rack was constructed. Interviews with USFS personnel indicate that 2,4-D may have been stored in this area in the 1960s. However, the barrel rack was not identified in aerial photographs until after 1975. The USFS used this area to occasionally treat fence posts with PCP in the late 1960s and early 1970s. However, USFS personnel did not remember the exact location of the tank or whether an above ground or underground tank was used.

On April 2, 2003, four shallow soil samples were collected from the barrel rack. The results are summarized in Table 4-2.

Table 4-2 Lake George Work Center Analytical Results, April 2003

Sample	2,4-D (mg/kg)	Pentachlorophenol (mg/kg)	TPH - Diesel Range Organics (mg/kg)	EDB (mg/kg)	Sample Depth (ft)
040203-1	9,560	38	10,200	ND	Surface
040203-2	NA	5,980(J)	NA	ND	Surface
040203-3	31	2	73	ND	4.5
040203-4	ND	328	11,200	ND	4.5
ND = Not Detected NA = Not Analyzed J = The analyte was positively identified, but the quantitation was below the reporting limit. Values in Bold exceed Soil Remediation Guidelines					

In addition, methyl ethyl ketone (MEK) was identified at 0.009 mg/kg in Sample 040203-2 and tetrachloroethene (PCE) was identified at 0.039 mg/kg in Sample 040203-4, which SAIC deemed did not indicate significant soil contamination.

On May 8 and 9, 2003, eight borings (H-1, H-2, H-3, H-4, H-5, H-6, H-7 and H-12) were sampled at the Drum Rack and Storage Area to a maximum depth of 45.5 ft bgs at locations shown in Figure 4-7. Nineteen subsurface soil samples were analyzed. Table 4-3 provides a summary of the results from these 19 samples. Samples from H-1 contained the most significant concentrations of PCP (12 mg/kg at 4 to 5 ft bgs) and 2,4-D (42 mg/kg at 12 to 13 ft bgs), with the highest detected concentration of TPH-DRO (1,200 mg/kg at 8 to 9 ft bgs) was observed in H-4. Figure 4-7 and Figure 4-8 are illustrations of the lateral and vertical extent of the PCP and 2,4-D contamination in soil at the Barrel Rack prior to the removal action.



Table 4-3 Soil Boring Sample Results at the Barrel Rack Area, May 2003

Drill Hole	Depth (ft)	Soil Sample	Pentachlorophenol (mg/kg)	2,4-D (mg/kg)	TPH (mg/kg)	Other Analytes Identified
H-1 Drum Rack	4-5	050803-1	12	0.2(D)	440	Xylene, Napthalene, 2-methylnapthalene
	12-13	050803-2	2	42(D)	24	Acetone, 2,4,5-T, Dichloroprop
	22-23	050803-3	0.34(J)	1.7(DP)	30	
	27-28	050803-4	0.79	3.3(DP)	ND	
H-2 Drum Rack	4-5	050803-5	ND	ND	27	Acetone, Diethylphthalate
	15	050803-6	ND	0.002(JP)	ND	
H-3 Drum Rack	5-6	050803-7	ND	ND	100	2,4,5-T
	17	050803-8	ND	ND	ND	
	23-24	050803-9	0.087(J)	ND	330	
H-4 Drum Rack	8-9	050803-10	NA	ND	1,200	Xylenes, 2,4,5-TP
H-5 Drum Rack	5-6	050803-11	ND	ND	22	
	16-17	050803-12	0.17(J)	ND	ND	Diethylphthalate
	33-34	050803-13	ND	ND	34	Toluene, Xylenes, bis(2-Ethylhexyl)phthalate, Diethylphthalate
H-6 Drum Rack	5-6	050803-14	NA	ND	ND	Dichlorodifluoromethane
	15-16	050803-15	NA	ND	ND	
H-7 Drum Rack	8-9	050803-16	ND	ND	ND	
	15-16	050803-17	ND	0.015	ND	
	30-31	050803-18	ND	ND	ND	
	44-45.5	050803-19	ND	ND	ND	Carbon Disulfide, Ethylbenzene, Acetone, Toluene, Xylenes, Benzoic Acid
ND = Not Detected NA = Not Analyzed NS = No Standard J -- The analyte of interest was detected below the routine reporting limit. The value should be regarded as an estimate. D -- The value reported derives from analysis of a diluted sample of the sample extract. P -- When a dual column gas chromatograph technique is employed, this flag indicates that test results from the two column differ by more than 25%. Values in Bold exceed Soil Remediation Guidelines. Generally Lauck's reported the higher value. Many of the other contaminants identified were detected at low concentrations. Some of the analytes are common laboratory contaminants. Other analytes are pesticides and constituents found in petroleum fuels.						
H-12 Drum Rack	5-6	050803-27	ND	ND	ND	bis(2-Ethylhexyl)phthalate
	13-15	050803-28	0.19(J)	0.002(JP)	32	Acetone
	13-15	050803-30	0.14(J)	0.007	47	Acetone
	22-23	050803-31	ND	ND	ND	

SAIC recommended that approximately 370 in-place CY be excavated and disposed of properly due to concentrations of PCP and 2,4-D that exceeded State and Federal soil standards. In addition, SAIC recommended that permanent groundwater monitoring wells be installed in this area to evaluate the impact on groundwater from chemicals released to soil from USFS historic activities.

On December 18 and 19, 2003, SAIC sampled six boreholes to approximately 50 ft bgs near the Barrel Rack, with soil samples collected at 5 ft intervals. However, based on field observations no soil samples were submitted for laboratory analysis. Five borings were completed as groundwater monitoring wells (H-7A, H-13, H-14, H-15 and H-16) and well construction details



are provided in Table 4-4 below. Figure 4-9 shows groundwater contours and a west-southwest gradient in the near surface aquifer from these wells in December 2003, which generally follows the topography as expected.

Table 4-4 Barrel Rack Well Construction Details, December 2003

Well	Total Depth (ft)	Completion Zone	Collar Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	pH	Temperature (°C)	Organic Vapor Reading (ppm)
H-7A	46.5	Granite soil, lakebed contact	256.06	37.79	218.27	7.43	9.9	0
H-13	41.5	Granite soil, lakebed contact	249.64	Dry Well	---	---	---	0
H-14	41.5	Granite soil, lakebed contact	247.22	Dry Well	---	---	---	0
H-15	41.5	Granite soil, lakebed contact	248.11	38.66	209.45	6.58	8.0	0
H-16	41.5	Granite soil, lakebed contact	253.23	34.24	218.99	7.23	8.1	0

On January 8, 2004, groundwater monitoring wells H-7A, H-15, and H-16 were sampled for VOCs, SVOCs, herbicides, and TPH-DRO (H-13 and H-14 were dry and not sampled) and results are provided in Table 4-5. Compounds of Concern PCP, 2,4-D and TPH-DRO were not detected in these samples. Three VOCs were detected: PCE at a maximum of 0.461(J) µg/L, bis (2-ethylhexyl) phthalate (B2P) at a maximum of 3.45 (J) µg/L, and di-n-octylphthalate at a maximum of 40.5 µg/L. The J-flag indicates the result is below the quantitation limit and is an estimated value. SAIC indicated that B2P and di-n-octylphthalate were related to laboratory contaminants and that the PCE concentrations were significantly less than the USEPA MCL of 5 µg/L, therefore PCE was not a risk driver at the site.

Table 4-5 SAIC Barrel Rack Groundwater Sample Results, January 8, 2004

Well	Groundwater Sample	Lab Sample Number	Penta-chlorophenol (ug/L)	2,4-D (ug/L)	TPH DRO (ug/L)	Tetrachloroethene (ug/L)	bis (2-Ethylhexyl) phthalate (ug/ml)	di-n-octylphtha. (ug/ml)	Additional Notes
H-15	010804-1	L0401177-01	U	U	U	U	U	23.3	
H-16	010804-2	L0401177-02	U	U	U	0.461 (J)	U	U	
	010804-3	L0401177-03	U	U	U	0.386 (J)	U	40.5	Duplicate of 010804-2
H7A	010804-4	L0401177-04	U	U	U	0.251 (J)	U	3.99 (J)	
	010804-5	L0401177-05	U	U	U	U	3.45 (J)	U	Duplicate of 010804-4
H-13	Dry	No Sample	---	---	---	---	---	---	
H-14	Dry	No Sample	---	---	---	---	---	---	

U - Not detected at or above the method detection limit.
J - Analyte was identified above the instrument detection limit but below the nominal reporting limit for the analyte.
TPH-DRO - Total Petroleum Hydrocarbons - Diesel Range Organics
Groundwater samples collected January 8, 2004.

On February 18, 2004, the USFS collected groundwater samples from H-7A, H-15, and H-16. Results are provided in Table 4-6. These samples were analyzed for VOCs only. Several VOCs were detected at concentrations below the laboratory quantitation limits and all results were J-flagged as estimated. Detected VOCs included MEK, acetone, carbon disulfide, ethylbenzene, methylene chloride and total xylenes.



Table 4-6 Groundwater Sample Results, February 18, 2004

Sample No.	Well Number	Volatile Organic Compounds						
		2-butanone ug/l	Acetone ug/l	Carbon Disulfide ug/l	Ethylbenzene ug/l	Tetrachloroethene ug/l	Methyl Chloride ug/l	Total Xylene ug/l
021804-1	H-16	2.7J	1.5J	U	U	U	0.52J	U
021804-2	H-16 (dup)	U	1.7J	U	U	0.48J	0.69J	U
021804-3	H-7A	3.6J	3.7J	1.5J	U	U	0.53J	1.6JB
021804-4	H-7A (dup)	4.5J	6.5J	0.61J	0.42J	U	0.44J	U
021804-5	H-15	3.6J	3.0J	U	U	U	0.57J	U

U - Not detected at or above the method detection limit.
J - Indicates an estimated value when the compound is detected, but is below the Lower Quantitation Limit.
B - Analyte detected in associated Method Blank, value not subtracted from result.
Groundwater samples collected February 18, 2004.

On April 27, 2004, SAIC collected groundwater samples from H-7A, H-15, and H-16. Results are provided in Table 4-7. These samples were analyzed for VOCs, SVOCs, chlorinated herbicides, and TPH-DRO. Several VOCs were detected at concentrations below the laboratory quantitation limits and all results were J-flagged as estimated. Detected VOCs included PCE, B2P, and di-n-octylphthalate. Phenol and TPH-DRO were detected but not verified in duplicate samples and were considered questionable during laboratory validation.

Table 4-7 Groundwater Sample Results, April 27, 2004

Well	Groundwater Sample	Lab Sample Number	Penta-chlorophenol (ug/L)	2,4-D (ug/L)	TPH DRO (ug/L)	Tetrachloroethene (ug/L)	phenol (ug/L)	bis (2-Ethylhexyl) phthalate (ug/ml)	di-n-octylphtha. (ug/ml)	Additional Notes
H7A	042704-1	L0404536-01	U	U	U	0.350 (J)	U	U	U	
	042704-7	L0404536-02	U	U	290 (J)	U	5.94	U	U	Duplicate of 042704-01
H-13	Dry	No Sample	---	---	---	---	---	---	---	
H-14	Dry	No Sample	---	---	---	---	---	---	---	
H-15	042704-15	L0404536-03	U	U	U	U	10.0	12.4	9.50	
H-16	042704-16	L0404536-04	U	U	U	0.352 (J)	5.44	U	U	
Trip Blank	Trip Blank	L0404536-05	---	---	---	U	---	---	---	Trip Blank shows 2.61 ug/l methylene chloride

U - Not detected at or above the method detection limit.
J - Analyte was identified above the instrument detection limit but below the nominal reporting limit for the analyte.
Groundwater samples collected April 27, 2004.
TPH-DRO - Total Petroleum Hydrocarbons - Diesel Range Organics.

4.3.6 Time Critical Removal Action, Soil at the Barrel Rack Area, URS, March 2004

In March 2004, URS conducted a Time-Critical Removal Action to mitigate the threat of exposure to PCP, 2,4-D, and TPH-DRO in soil at the Barrel Rack Area (URS 2004). Soil associated with this removal action was excavated and disposed of at either Waste Management RCRA Subtitle D facility in Denver, Colorado (DADS); or the Lone Mountain Subtitle C facility in Waynoka, Oklahoma, if the stockpile analytical results exceed the Universal Treatment Standard (UTS) for either PCP (7.4 mg/kg) or 2,4-D (10 mg/kg), or if uncontaminated, was used as backfill for the excavation.

The excavation at the Barrel Rack area approximated 60 ft in diameter and approximately 25 ft in depth. Soil removed included approximately 570 tons (380 in-place CY). Soil samples were analyzed during the removal action for PCP using amino-assay field test kits with 0.1 mg/kg detection limit. The soil at the final excavation extent was sampled and laboratory



confirmation analyses were conducted for PCP (less than 3.3 mg/kg), 2,4-D (less than 690 mg/kg) and TPH-DRO (less than 500 mg/kg). Figure 4-7 and Figure 4-8 illustrate the horizontal extent, and vertical extent of the excavation, respectively.

4.3.7 Radium in Groundwater at Old USFS Well, USFS, 1990s

According to a Technical Briefing Paper (USFS 2015), the USFS detected high levels of radium in groundwater from the Old Well. The Old Well is located approximately 100 feet west of the Old Ranger Residence, within the Site facility. The Old Well was not permitted, and had been in use since the 1960s. The USFS rehabilitated another water source (a spring box), approximately 1,000 feet east of the original well, for potable water use. This spring-fed potable water source became less viable prior to 2011, and the USFS installed a new groundwater supply well further east, in the fractured Precambrian granitic aquifer, which is currently in use at the Site.

4.3.8 Aroclor 1254 in Groundwater at Old USFS Well, 2011 through 2013

On July 6, 2011, the USFS collected and analyzed groundwater from the Old Well to determine if it was acceptable as a future potable water source. This sampling event was the first time samples were analyzed for PCBs. The samples were analyzed for radiological parameters Gross Alpha (α , maximum 3.7 pico-Curie per Liter [pCi/L]), Gross Beta (β , maximum 0.4 pCi/L), radium-228 (maximum 0.6 pCi/L), uranium (maximum 1.5 pCi/L); E-coli (absent); and organics by EPA 500 Methods (PCBs detected at 4.9 $\mu\text{g/L}$). Following PCB detection in groundwater at the Old Well in July 2011, three additional sampling events were conducted in 2011 and 2013 for PCBs in the Old Well.

- On November 3, 2011, the USFS sampled and analyzed groundwater from the Old Well, for PCBs by EPA 505 (results of 73.2 $\mu\text{g/L}$).
- On April 15, 2013, the USFS sampled and analyzed groundwater from the Old Well, for pesticides and PCBs by EPA 505 (Only PCBs detected, results of 16.7 $\mu\text{g/L}$).
- On July 9, 2013, the USFS sampled and analyzed groundwater from the Old Well, PCBs by Solid Waste Method (SW) 8082 for nine Aroclor congeners (Only Aroclor 1254 detected, results of 73 $\mu\text{g/L}$).

4.3.9 Site Investigation, Abaci, June 2014

Between April 15 and 25, 2014, Abaci Consulting, LLC (Abaci) installed three shallow wells to a total depth of 60 ft bgs near the Old Well, to characterize the surrounding shallow groundwater aquifer for Aroclor 1254 and associated congeners (see Figure 4-3) (Abaci 2014a). Soil samples were collected at five-foot intervals in each boring, and one sample from each boring was analyzed for PCBs by SW 8082A, though no obvious signs of contaminated soil were observed during drilling. An additional sample of debris (sediment) was collected from the inside of the well vault associated with the Old Well and analyzed for PCBs (Aroclors) by SW 8082 at TestAmerica in Arvada, Colorado.



The three soil samples collected from the soil borings [LGSB1-(34-36), LGSB2-(44-46), and LGSB3-(34-36)] were each analyzed for nine individual Aroclors, which were not detected in these samples. The sample from the Old Well pit floor detected Aroclor -1254 at 1,100 µg/kg.

Groundwater was encountered in each boring between 50 and 54 ft bgs during drilling and each boring was completed with a groundwater monitoring well of the following construction:

- Two-inch inside-diameter (ID) polyvinyl chloride (PVC) casing from ground to 45 ft bgs;
- Two-inch ID PVC screen with 0.01-inch slot size between 45 and 60 ft bgs;
- Filter pack included 10-20 sieve size silica sand from 43 to 60 ft bgs;
- LGMW1 included an aboveground completion; and
- LGMW2 and LGMW3 included a flush-mount completion.

Following completion and development of the three new monitoring wells (LGMW1, LGMW2, and LGMW3), each new well and the Old Well were sampled using a submersible pump or bailer (LGMW3 was sampled with a bailer due to slow recharge) and analyzed at TestAmerica in Arvada, Colorado for PCBs by SW 8081A. Groundwater samples from the three new wells did not detect PCBs. Aroclor 1254 was detected in the normal sample from the Old Well (30 µg/L) and in the duplicate sample from the Old Well (25 µg/L), both samples exceeded the MCL of 0.5 µg/L.

Abaci concluded that Aroclor 1254 detected in the well vault debris at 1,100 µg/kg may be associated with the Aroclor 1254 detected in the groundwater in the Old Well, through either leaching along the outer casing or by entering the inner casing directly to groundwater. Abaci recommended that the well vault floor be cleaned, the well casing be extended to above ground surface and the well vault be filled to ground surface. In addition, Abaci recommended that the well be pumped and cleaned to remove any PCB-contaminated debris from the interior of the casing. Finally, Abaci recommended that the pumped effluent be treated with a granular activated carbon (GAC) filtration system, prior to being released to the environment.

4.3.10 Pump and Treat Removal Action, Abaci, August 2014

Between August 18 and 23, 2014, Abaci conducted a pump and treat removal action at the Old Well (Abaci 2014b). A 120-volt, ½-horsepower Red Lion submersible well pump was lowered to approximately 152 ft bgs in the Old Well and groundwater was pumped from the well at a stabilized water level of approximately 117 ft bgs at a pumping rate of 4.8 gpm. The pump was run continuously for approximately 26 hours at that stable pumping rate in the Old Well. Water was discharged into one of three 16,000-gallon storage tanks for holding.

For treatment, water from the holding tanks was pumped through a dual-phase GAC system at approximately 3 gpm. A totalizing flowmeter measured the flow and total discharge from the second GAC effluent. The total volume of water treated was 13,455 gallons. Samples of the effluent were collected at the initialization of pumping on August 18, 2014 (no PCBs detected), and at the completion of pumping on August 22, 2014 (no PCBs detected).



Untreated groundwater samples were also collected after the first 450 gallons were removed from the Old Well on August 18, 2014 (Aroclor 1254 detected at 95 µg/L and 3.2 µg/L in split samples, no explanation for the discrepancy) and after 13,455 gallons were removed on August 22, 2014 (Aroclor 1254 at 0.83 µg/L, still greater than the MCL of 0.5 µg/L).

Finally, Abaci extended the casing from the Old Well to above ground surface, filled in the vault with clean sand, and finished the well with an above-ground mount.

Abaci measured the drawdown response in the three shallow monitoring wells installed in April 2014 (LGMW1, LGMW2 and LGMW3), located within 100 ft of the Old Well. Before the pump test began, static water levels were measured in each well on August 18, 2014 at approximately 12:00 PM. Measurements were collected periodically throughout the pumping activity and again at the end of the pumping activity at 3:10 PM on August 21, 2018. The total drawdown in LGMW1 (3.87 ft) and LGMW02 (2.86 ft) indicate qualitatively that these wells are hydraulically connected to each other and the Old Well. Conversely, drawdown in LGMW3 was minimal (0.15 ft) indicating that it is hydraulically isolated from the other three wells in the test. This information provides an important reference in the assessment of static water level readings in these wells, and the inference of groundwater flow from these readings. Abaci noted that the relative static groundwater elevation in LGMW3 was consistently lower than LGMW1 and LGMW2 and inferred a groundwater flow direction to the south rather than along the topographic gradient to the west southwest. However, this was inconsistent with the water table gradient provided by SAIC at the Barrel Rack Investigation, which indicated a west-southwest gradient from six wells installed there. The pump test results provide further evidence to disregard water levels associated with LGMW3 when developing groundwater flow models.

After the pump and treat removal action and the extension of the well casing to above ground surface was completed, Abaci concluded that the treatment was a success, lowering the Aroclor 1254 concentration in groundwater to just above the MCL. Abaci recommended that the well be used for non-potable activities, such as fire-fighting. However, the USFS did not find this recommendation to be acceptable. Abaci also recommended that additional samples be collected periodically and analyzed for PCBs from the Old Well as split samples, to be analyzed at two different laboratories, and that Matrix Spike/Spike Duplicate (MS/MSD) quality assurance analyses be conducted at the environmental laboratory to assess potential matrix interference.

On December 14, 2015, the USFS sampled and analyzed groundwater from the Old Well, PCBs by SW 8082 for nine Aroclors (Only Aroclor 1254 was detected, results of 520 µg/L). It has since been concluded that this result is not representative of dissolved concentrations of Aroclor 1254 in water, which is limited by the solubility limit of Aroclor 1254 (43 µg/L, USEPA RSL Table May 2016).



4.3.11 Lake George Work Center and Private Well Investigation, USEPA, March 2016

On March 28 and 29, 2016, the USEPA conducted groundwater sampling in the study area, including from the Old Well; one shallow well; a spring located south of the Facility; and three offsite private wells. Figure 4-10 illustrates the wells that were sampled and their proximity to the Old Well. Groundwater samples were analyzed by the USEPA contract laboratory Environmental Science Corporation (ESC), Mount Juliet, Tennessee, on a short turn-around schedule for VOCs by method SW 8260, SVOCs by method SW 8270, and PCBs by method SW 8082.

Results were received by the USEPA on March 31, 2016. Analyses of samples from three private wells, LGMW3, and the spring sampling location did not detect VOCs, SVOCs or PCBs. The reporting detection limit for PCBs was 0.5 µg/L, which is equal to the USEPA MCL for PCBs. The sample collected from the Old Well did not detect VOCs or SVOCs, but did detect PCB 1254 (also known as Aroclor 1254) at 19 µg/L, which continues to exceed the USEPA MCL of 0.5 µg/L, though is much less than the 520 µg/L of Aroclor 1254 detected in December 2015.

4.3.12 Lake George Work Center Old Well Down-Well Video, Applied Intellect, August 2016

On August 31, 2016 and September 1, 2016, the USFS and AI conducted a down-well video survey of the Old Well to evaluate the well construction and condition, prior to conducting any cleanup activities. A down-well video camera was lowered into the well from ground-surface to the total depth of the well, and the video data was recorded and provided to the USFS on digital versatile disk (DVD) on September 9, 2016. The video recording and other data collected provides the following information.

- A 6-inch ID PVC casing from stick up to approximately 6 ft bgs, followed by 6-inch ID steel casing to the total depth (TD) of the well (greater than 156 ft bgs).
- The water table was observed at approximately 48.6 ft bgs and the steel casing above the water table appeared to be good condition.
- No light, nonaqueous-phase liquid (LNAPL), such as an oily sheen, was observed on the water surface, and a grab sample of the surface did not have any noticeable odor;
- From 48.6 ft bgs to 66 ft bgs, the inside of the casing appeared to be in good condition, with some limited oxidation scaling.
- At approximately 66 ft bgs to TD, oxidation scale/encrustation increased significantly in a pattern that indicates perforations in the steel casing (steel casing is perforated over the water bearing units to allow water to flow into the well). Sediments were observed in the water column from areas where the camera disturbed the encrusted casing, while none were observed in the water column below the camera.;
- At 154.5 ft bgs, sediments were observed in the bottom of the well, and observed in the water column from the camera touching the sides of the well during its transit. It suggests that sediments in the bottom of the well are most likely resulting from oxidation falling off the sides of the casing over time.



- The camera was lowered approximately 0.5 ft into the unconsolidated sediments until it encountered refusal, most likely from consolidated sediments remaining in the bottom of the well.

Based on these observations, the USFS has determined that there is a significant potential for Aroclor 1254 in the Old Well water column to adsorb to sediments in the base of the well and to the significant encrustation observed between 66 ft bgs and TD.

4.3.13 Lake George Work Center Old Well Sampling, Applied Intellect, December 2016

On December 21, 2016, AI sampled well water from the Old Well using a two-person sampling crew (AI, 2017a). Don Lira [Contracting Officer's Representative (COR)] was contacted to ensure all coordination was properly conducted. Samples were collected in accordance with the Sampling and Analysis Plan Addendum (SAPA) and Health and Safety Plan.

Two samples were collected from the Old Well on December 21, 2016. The sampling pump was lowered to the total depth of the well, then raised 1 foot before sampling was conducted.

- LKGEOWGW-01-12212016 was not filtered and represents total PCBs in the well water sample (including undissolved sediments). As noted in the field notes, the sample condition was "highly turbid, orange".
- LKGEOWGW-02-12212016 was field-filtered through a 0.45-micron filter and represents dissolved PCBs in the well water sample (no particles bigger than 0.45 microns). As noted in the field notes, the sample condition was "clear".

Samples were delivered under chain of custody to ESC-Denver on December 21, 2016 for shipment to their Tennessee lab on December 22, 2016.

4.3.13.1 Sample Results

Samples results were received on December 27, 2016 via email in ESC Laboratory Report L880666. Both samples were analyzed by SW 846 Method 8082 with the following results.

LKGEOWGW-01-12212016 (unfiltered, total):

- Analysis required a 5x dilution, most likely due to the PCBs adsorbed to the particulates;
- Results detected PCB-1254 at 0.0347 milligrams per liter (mg/L); and
- All other PCBs were not detected above 0.00050 mg/L.

LKGEOWGW-02-12212016 (filtered, dissolved):

- Analysis did not require dilution; and
- Results indicated that PCBs were not detected above 0.00050 mg/L.



4.3.13.2 Conclusions

PCBs were not detected in the filtered sample, which indicates that PCBs are not dissolved in the well water above the detectable concentration of 0.0005 mg/L. The filtered sample result, along with the large Koc of 1.3×10^5 L/kg indicates that there is little risk for PCBs in the well to travel in the groundwater to other receptors, once the well has been properly abandoned.

PCBs were detected in the unfiltered sample (0.00347 mg/L), which indicates that PCBs are adsorbed to the casing wall oxidation sediments. In addition, it was concluded that most the sediment at the bottom of the Old Well originates from oxidation on the casing walls, and is likely also impacted by one or more PCBs (PCB 1254).

4.3.13.3 Recommendations

It was recommended that the USFS abandon the Old Well with a grout slurry from the bottom of the well (approximately 154 ft below ground surface) to ground surface. The grout will encapsulate the PCB-laden sediment and casing oxidation and seal the casing so that water from the aquifer will not pass through the casing. In addition, potentially contaminated well water will no longer be available for any use from this well.

4.3.14 TSCA Removal Action at the Old Well, Applied Intellect July 2017

On June 8, 2017, the USFS sent a letter to the USEPA, documenting previous activities at the Old Well and informing the USEPA of their intention to properly abandon the “Old Well” to remove the potential for future exposure.

On June 29, 2017, the USEPA Region 8 provided its approval of the abandonment plan in accordance with 40 CFR 761.61(c) *Risk-based disposal approval*.

On July 6, 2017 and July 7, 2017, Applied Intellect and subcontractor Authentic Drilling of Larkspur CO, abandoned the “Old Well” and three associated groundwater monitoring wells (LGMW1, LGMW2, and LGMW3) (AI, 2017b). The “Old Well” was grouted through the screened interval, from 156 ft bgs (TD) to 49 ft bgs. Approximately 20 ft of water column remained in the well, which was absorbed with bentonite chips from 49 ft to 3 ft bgs. The six-inch diameter PVC casing was cut off at three ft bgs, and the excavation was filled with the remaining excavated soil, and augmented with clean onsite soil to get to final grade. Final Well abandonment reports (Form NO GWS 09 03/2017) were submitted to the CDWR the week of July 17, 2017.

The three monitoring wells were abandoned by filling the screened interval with sand and then adding bentonite chips to three feet bgs. Bentonite chips were hydrated with potable water; wells were cut off three feet bgs. All surface completion materials and bollards were removed and disposed offsite as municipal solid waste. Excavations at the wells were backfilled with excavated soil, then augmented with clean soil obtained from an on-site soil pile approximately 150 feet south (uphill) of the fenced equipment storage enclosure south of the “Old Well”. Soil



was compacted in approximate 1.5-foot thick lifts. Well locations were regraded and smoothed to original surface contours.

4.4 Previous Investigations, Lake George Landfill

The Lake George Landfill (Figure 4-11) is located east of Lake George, Colorado along Trail Creek Road. The Lake George Landfill is located on public land administered by the USFS approximately one quarter mile northeast of the town of Lake George. The USFS reported that the landfill was used by the town from the 1950s until the mid or late 1960s. After the late 1960s, the landfill was closed and the surface reclaimed into a meadow. In the 1990s, a USFS pistol range was constructed in the upper end of the valley where the landfill is located (SAIC 2006). SAIC inferred that the Lake George Landfill was unregulated and therefore was likely operated in a manner in which combustible waste was burned in trenches and noncombustible waste was buried, to deal with wind-blown waste associated with paper products and other light combustibles. SAIC also concluded that industrial wastes, now considered hazardous, were potentially also disposed there, and had the potential to migrate vertically to groundwater and laterally via groundwater transport pathways.

4.4.1 Site Characterization, SAIC, November through December 2005

These activities were documented in a Final Initial Site Investigation Report (SAIC June 6, 2006). On November 10, 2006, following a record review, SAIC conducted a geological mapping and geophysical survey at the Lake George Landfill. The survey indicated a fault extended from northwest to southeast, through the landfill. The observations led SAIC to infer that the underlying stratigraphy is composed of weathered granite with low hydraulic permeability, and that preferential groundwater flow would be expected along the fault displacement, in a southeast direction. Figure 4-11 illustrates the landfill features, which were estimated at 460 ft in length (northwest to southeast) and between 90 ft wide (northwest) and 140 ft wide (southeast). SAIC inferred that contaminants released from the landfill would potentially migrate along the fault in the southeast direction.

On December 4 and 5, 2005, SAIC installed four groundwater monitoring wells in or adjacent to the landfill deposits, as shown in Figure 4-11. Three wells (LG-1, LG-2 and LG-3) were located along the southwestern perimeter of the landfill and the fourth (LG-4) was located upgradient of the landfill, to the northwest. Table 4-8 provides the well construction details for these wells. The wells ranged in total depth from 23.8 ft bgs (LG-2) to 64 ft bgs (LG-4). No indication of contaminated soils was observed during drilling, therefore, no soil samples were analyzed for chemical constituents.



Table 4-8 Well Construction Details, Lake George Landfill

Monitoring Well	Total Depth (ft)	Relative Collar Elevation (ft)	Well Casing/Screen Material	Depth to Groundwater (ft)	Relative Groundwater Elevation (ft)	Surface Completion
LG-1	33.5	128.28	2-inch PVC	24.63	104.17	2.5 ft stickup protective casing
LG-2	23.8	130.02	2-inch PVC	13.45	116.57	2.5 ft stickup protective casing
LG-3	28	130.80	2-inch PVC	30.88	99.92	2.5 ft stickup protective casing
LG-4	64	165.48	2-inch PVC	37.18	128.30	2.5 ft stickup protective casing

PVC – poly vinyl chloride schedule 40

On December 21, 2005, SAIC collected groundwater samples at newly installed landfill groundwater monitoring wells. Samples were analyzed for VOCs, SVOCs, chlorinated herbicides, by methods described above, and chlorinated pesticides by Method SW8081 at Kemron Environmental Services Laboratory in Marietta, Ohio. Although PCBs may be analyzed by SW8081, review of laboratory data indicate that PCB results were not provided (SAIC 2006).

Results from monitoring wells LG-1, LG-2, and LG-3 (southeast extent of the fault within the landfill) indicated only B2P was detected in all samples, ranging from 3 to 6 µg/L. SAIC and Kemron concluded that B2P was probably an artifact of sampling or laboratory cross-contamination. Results from the sample collected from LG-4 (northwest extent of the fault within the landfill) indicated groundwater contained nine detected VOCs including: benzene (0.150 µg/L), toluene (1.59 µg/L), ethylbenzene (1.04 µg/L), xylenes (5.37 µg/L), isopropyl benzene (0.463 µg/L), n-propyl benzene (0.505 µg/L), trichlorofluoromethane (0.488 µg/L), 1,2,4-trimethylbenzene (1.5 µg/L), and 1,3,5-trimethylbenzene (0.62 µg/L). SAIC noted that the suite of compounds detected indicated a gasoline source. Although SAIC also noted that all concentrations were below State and Federal standards, the current (May 2016) USEPA RSL for 1,2,4-trimethylbenzene is 1.5 µg/L which is the same as the measured value. The RSL for 1,2,4-trimethylbenzene represents a non-cancer Hazard Quotient of 0.1, set to account for multiple contaminants.



4.4.2 Site Investigation and Removal Action, MSE, June 2006 through May 2007

On June 12, 2006, Millennium Science and Engineering (MSE) removed remnants of a partially buried 55-gallon drum and surrounding soil that may have been impacted by fluids released from the drum, from a location less than 100 ft downgradient (south-southwest) of LG-4. Six soil samples were collected from the excavation which approximated 8 ft by 11 ft and 8 ft deep. Samples were analyzed for TPH-DRO, VOCs, SVOCs including PCP, chlorinated herbicides, chlorinated pesticides, and total metals by Method SW6010B and SW7471 for mercury. These samples were not analyzed for PCBs, based on a review of the laboratory data packages. Samples were analyzed at ESC of Mt Juliet, Tennessee.

TPH-DRO was detected in all samples, ranging from 32,000 mg/kg at 6 ft bgs in a stained layer to 27 mg/kg at 6 ft bgs at the western extent. The sample collected at the total depth of the excavation (8 ft bgs) had a result of 1,000 mg/kg. The Colorado Risk Based Action Level (RBSL) for TPH-DRO is 500 mg/kg. Four of six samples exceeded the RBSL for TPH-DRO.

Seven VOCs were detected in the six soil samples, but only naphthalene and 1,2-dichlorobenzene were detected in the deepest sample (8 ft bgs). None of the VOCs detected exceeded State or Federal Action Levels.

Five SVOCs were detected in two samples. Four polycyclic aromatic hydrocarbons (PAHs): benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h)perylene and benzo(a)pyrene were detected in a stained layer at 6 ft bgs. Benzo(b)fluoranthene (0.92 mg/kg) exceeded the RSL (0.62 mg/kg) and benzo(a)pyrene (0.75 mg/kg) exceeded the RSL (0.062 mg/kg). SVOCs were not detected in the deepest, 8 ft bgs sample. Pesticides and herbicides were not detected in these six samples.

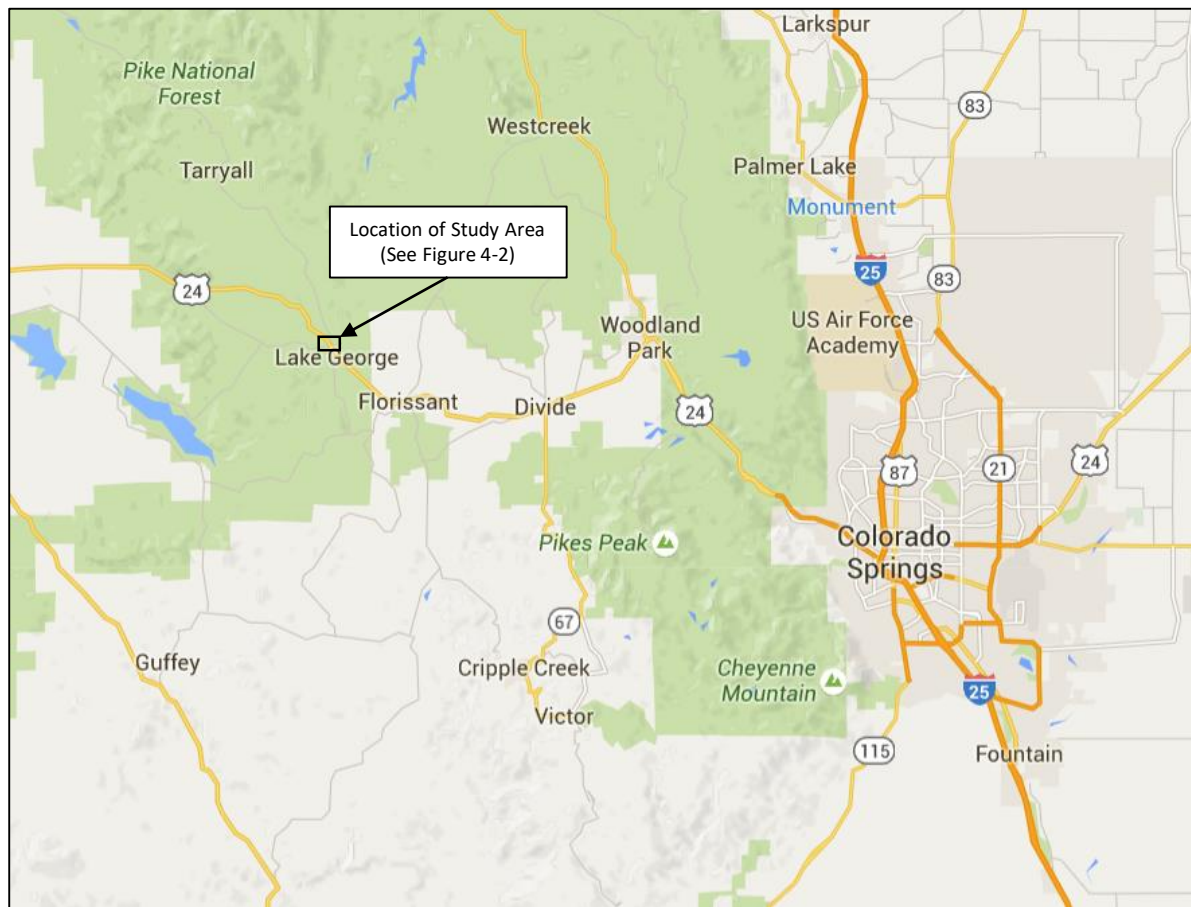
Metals were detected in all samples, but only lead exceeded the RBSL of 400 mg/kg (in three of six samples). Lead concentrations ranged from 10 mg/kg (at the 6 ft bgs eastern extent of the excavation) to 10,000 mg/kg in the stained layer at 6 ft bgs. Lead at 8 ft bgs was 82 mg/kg.

On October 11, 2006, MSE collected groundwater samples from monitoring wells LG-1, LG-2, LG-3 and LG-4, and had them analyzed at ESC for: TPH-DRO by Method SW8015M, VOCs by Method SW8260 and drinking water Method 524.2, SVOCs by drinking water Method 525.2, chlorinated herbicides including PCP by drinking water Method 515.1, and chlorinated pesticides and PCBs by drinking water Method 505. TPH was detected in monitoring wells LG-1 and LG-4 at concentrations of 0.051 mg/L and 0.058 mg/L respectively. Di(2-ethylhexyl)phthalate was detected in LG-4, LG-2, and LG-1 groundwater samples at concentrations of 0.0014 mg/L, 0.0029 mg/L and 0.0014 mg/L, respectively. None of the chemical constituents detected in any of the groundwater samples are present at concentrations approaching potentially applicable regulatory screening criteria, including Colorado Water Quality Control Commission Basic Standards for Groundwater or MCLs.



These groundwater samples were the first to be analyzed for PCBs based on the current data review and are located approximately 2,800 feet north of the Old Well. The ESC data packages indicate that they were analyzed for PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, and PCB-1260. PCBs were not detected in any groundwater samples during the 2006 sampling event.

During the groundwater sampling event, MSE collected a set of static water levels from the four groundwater monitoring wells at the landfill. Figure 4-12 presents water levels from SAIC groundwater measurements in October 2006 in red, and water levels from the MSE sampling event in May 2007. The direction of the gradient vector is southwest in both events, similar to the topographic gradient. The gradient is steeper in the fall event in October 2006, probably the result of drainage over the summer as compared to the higher water levels measured during the spring event in May 2007.

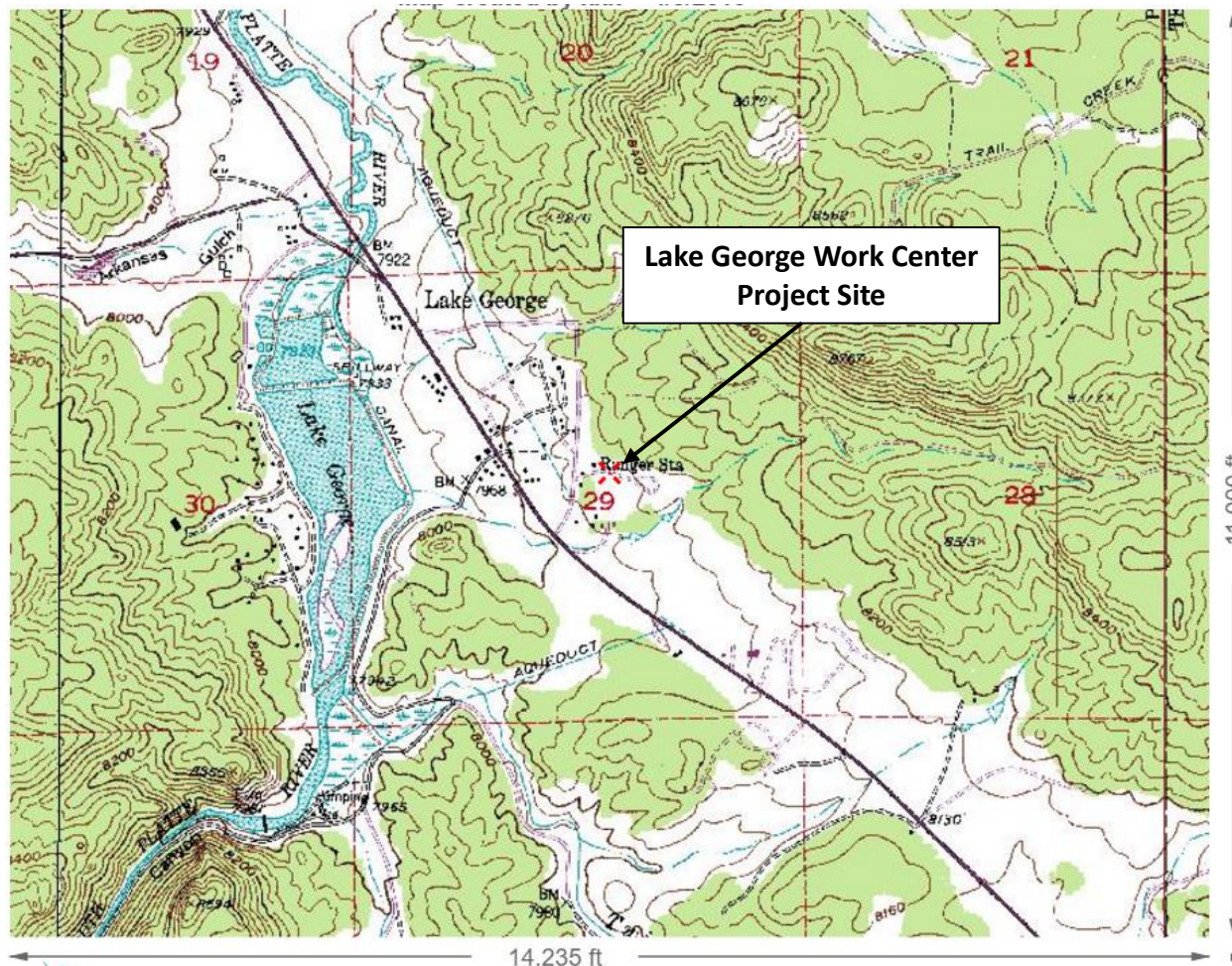


Lake George Location Map
Colorado



Figure 4-1 Regional Location Map
Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado





Source: Colorado Division of Water Resources, AquaMap, 2016



Lake George Location Map
Colorado

Figure 4-2 Lake George Vicinity Map

Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado



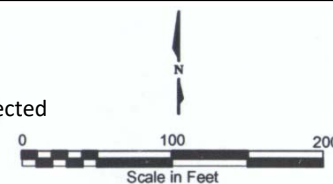


Revised From US Forest Service Administrative Record File, 2004
Image source: 2013 Google Earth Imagery

Figure 4-3 Site Feature Map
Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado



- Shallow groundwater monitoring wells
Installed in 2014 (Abaci, 2014)
- Former USFS Supply Well "Old Well", PCBs detected
in groundwater samples (2011 – 2015)



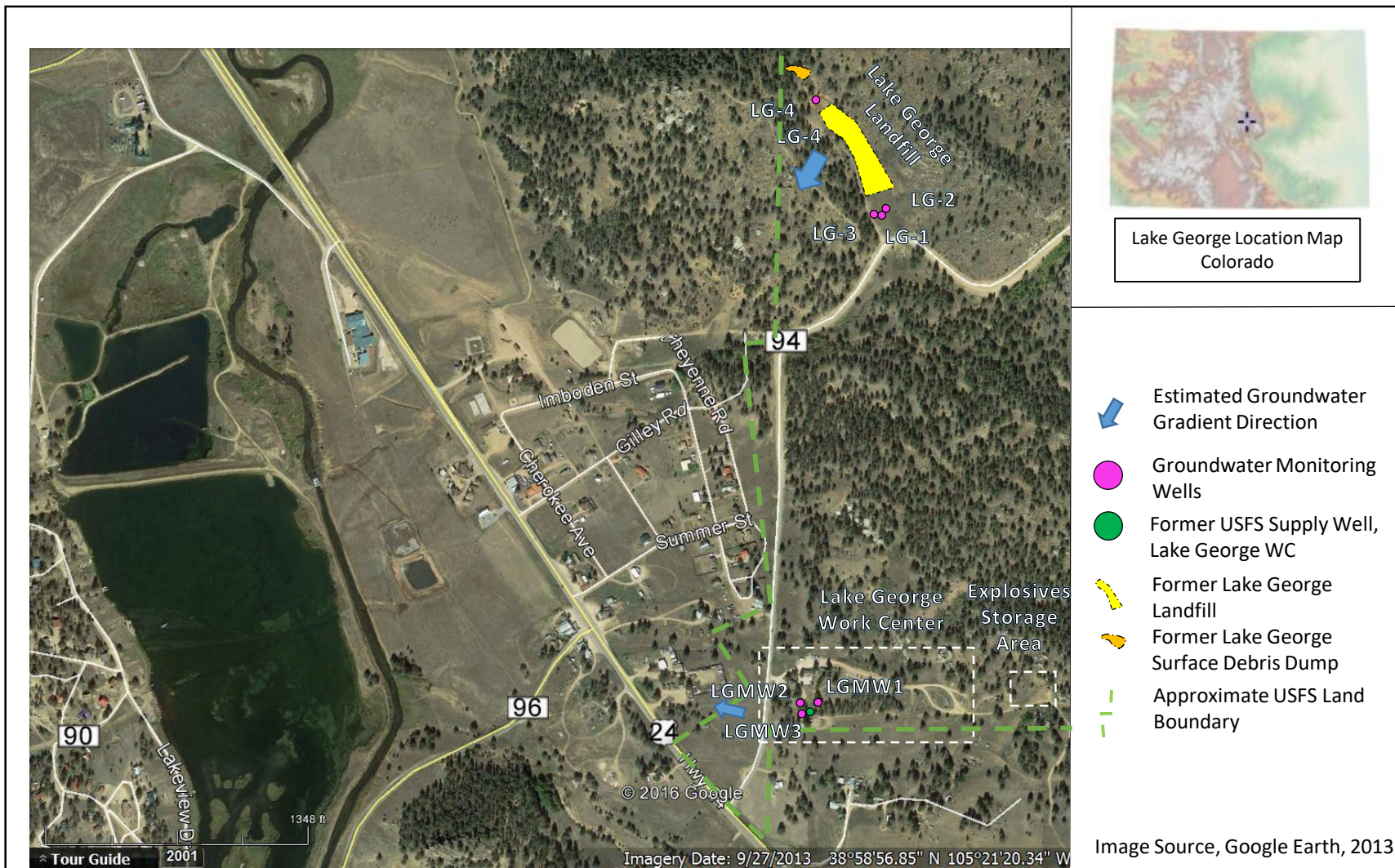
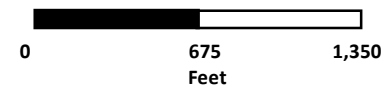
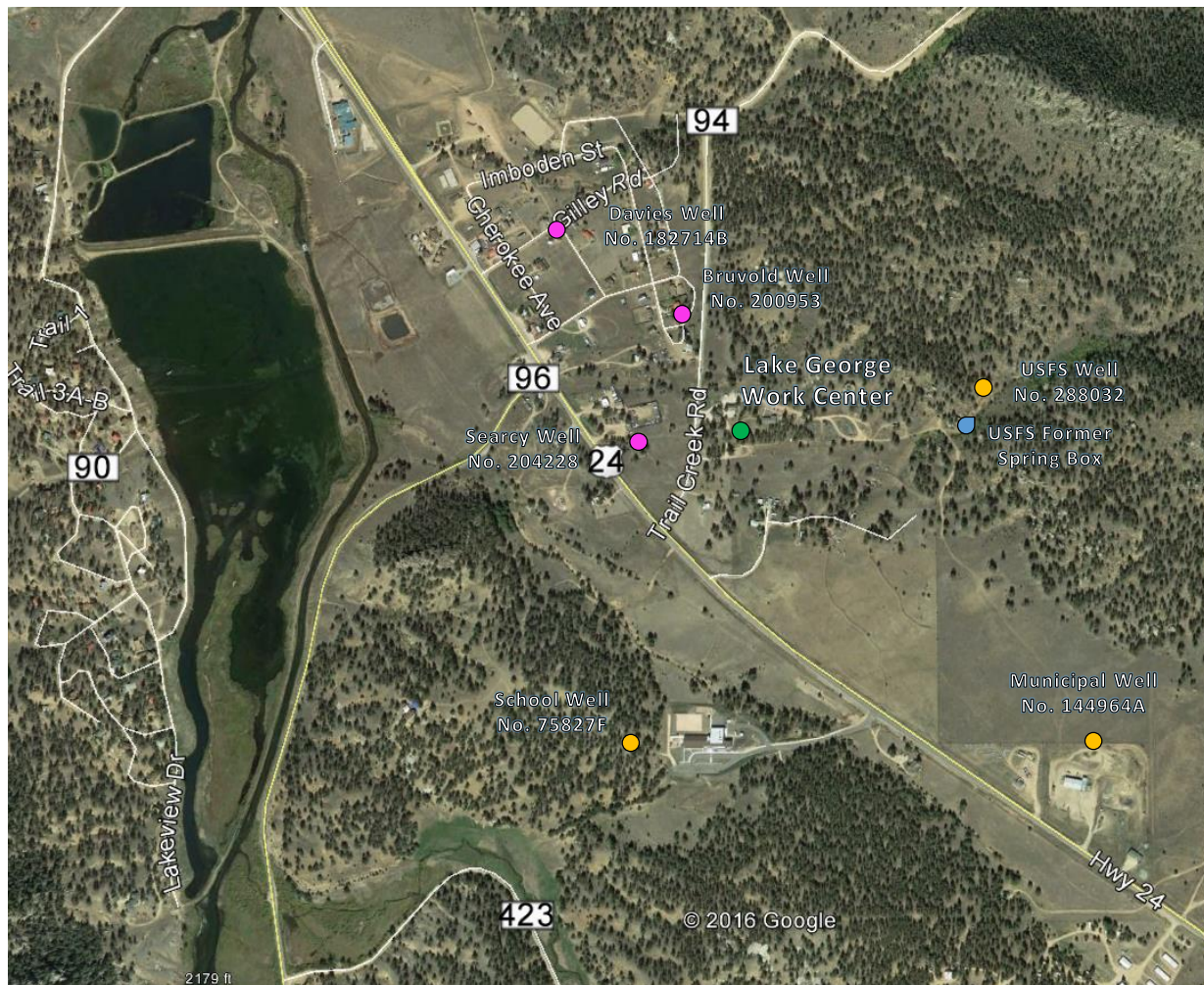


Figure 4-4 Site Vicinity Feature Map
 Lake George Work Center Preliminary Assessment
 Lake George, Park County, Colorado

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Lake George Location Map
Colorado

- Former USFS Supply Well, Lake George WC
- Lake George Alluvial Supply Wells Presented in Appendix C
- Lake George Alluvial and Bedrock Supply Wells Presented in Appendix C
- Lake George WC Former Spring Box

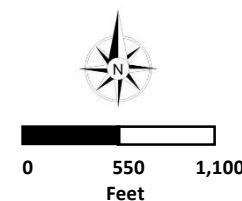


Image Source, Google Earth, 2013

Figure 4-5 Locations of Selected Lake George Groundwater Supply Wells

Lake George Work Center Preliminary Assessment

Lake George, Park County, Colorado



Figure 4-6a

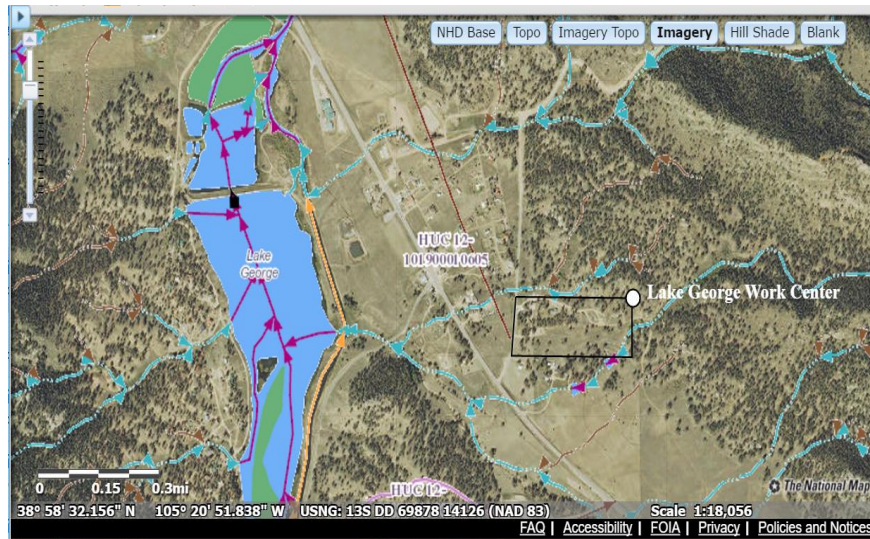
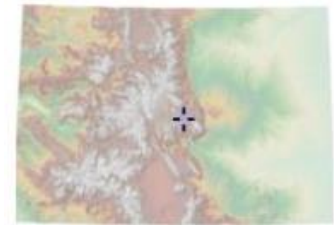


Figure 4-6b



Lake George Location Map
Colorado

Legend

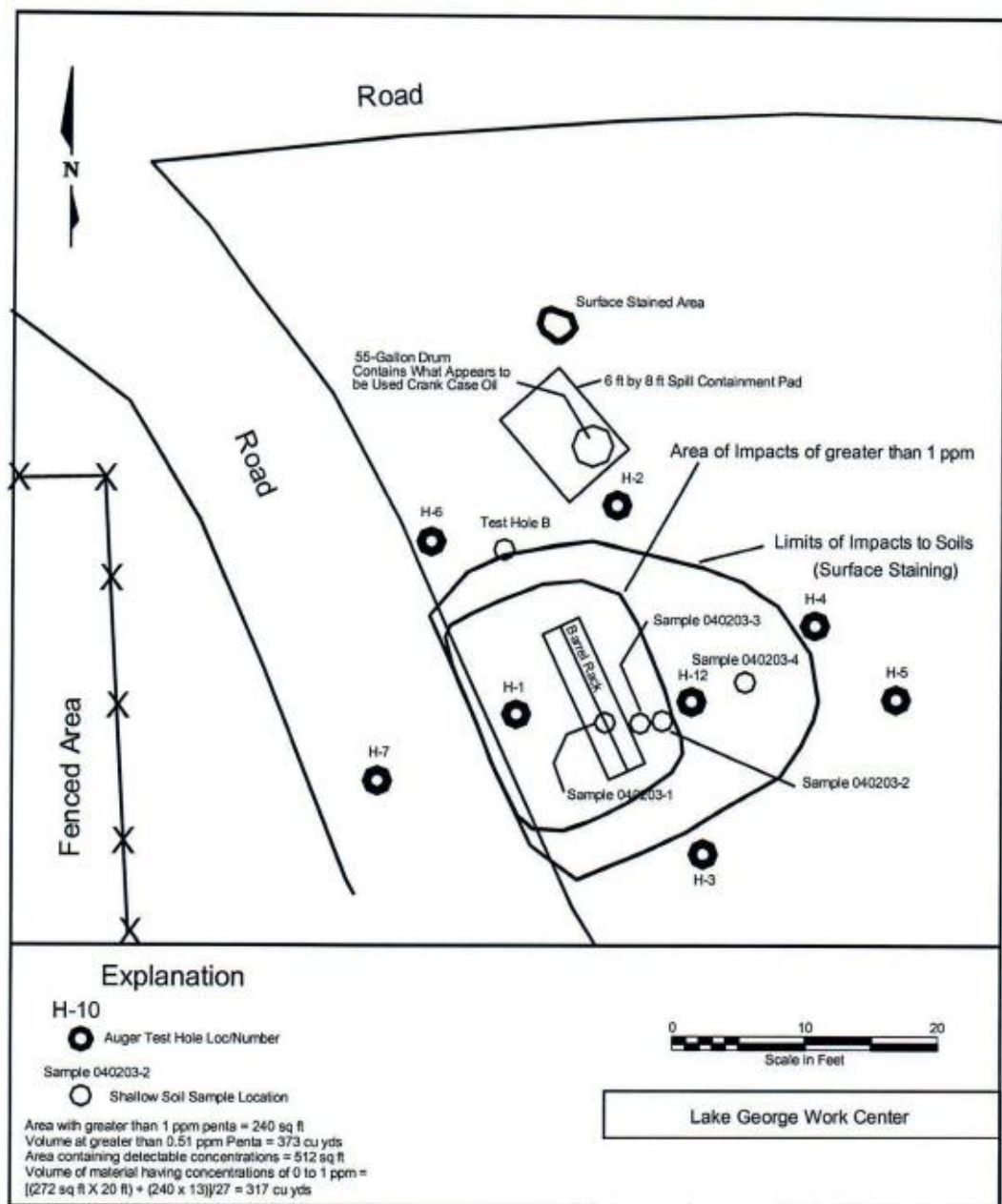
Waterbodies	Wetlands
<ul style="list-style-type: none"> Lake/Pond Reservoir Swamp/Marsh 	<ul style="list-style-type: none"> Emergent Wetlands Forest/shrub Wetlands
Flow Direction	Flowlines
<ul style="list-style-type: none"> Connector Canal/Ditch Underground Conduit Stream/River Stream/River - Perennial Stream/River - Intermittent Stream/River - Ephemeral Pipeline Artificial Path 	<ul style="list-style-type: none"> Perennial Intermittent Ephemeral Artificial Path Canal/Ditch Coastline Connector Pipeline Underground Conduit

Image Source,
<http://viewer.nationalmap.gov/viewer/nhd.html?p=nhd>

Figure 4-6 Site Hydrology Map

Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado





Source: SAIC 2003

Figure 4-7 Detail of Barrel Rack, Showing extent of PCP and 2,4-D in Soils
 Lake George Work Center Preliminary Assessment
 Lake George, Park County, Colorado

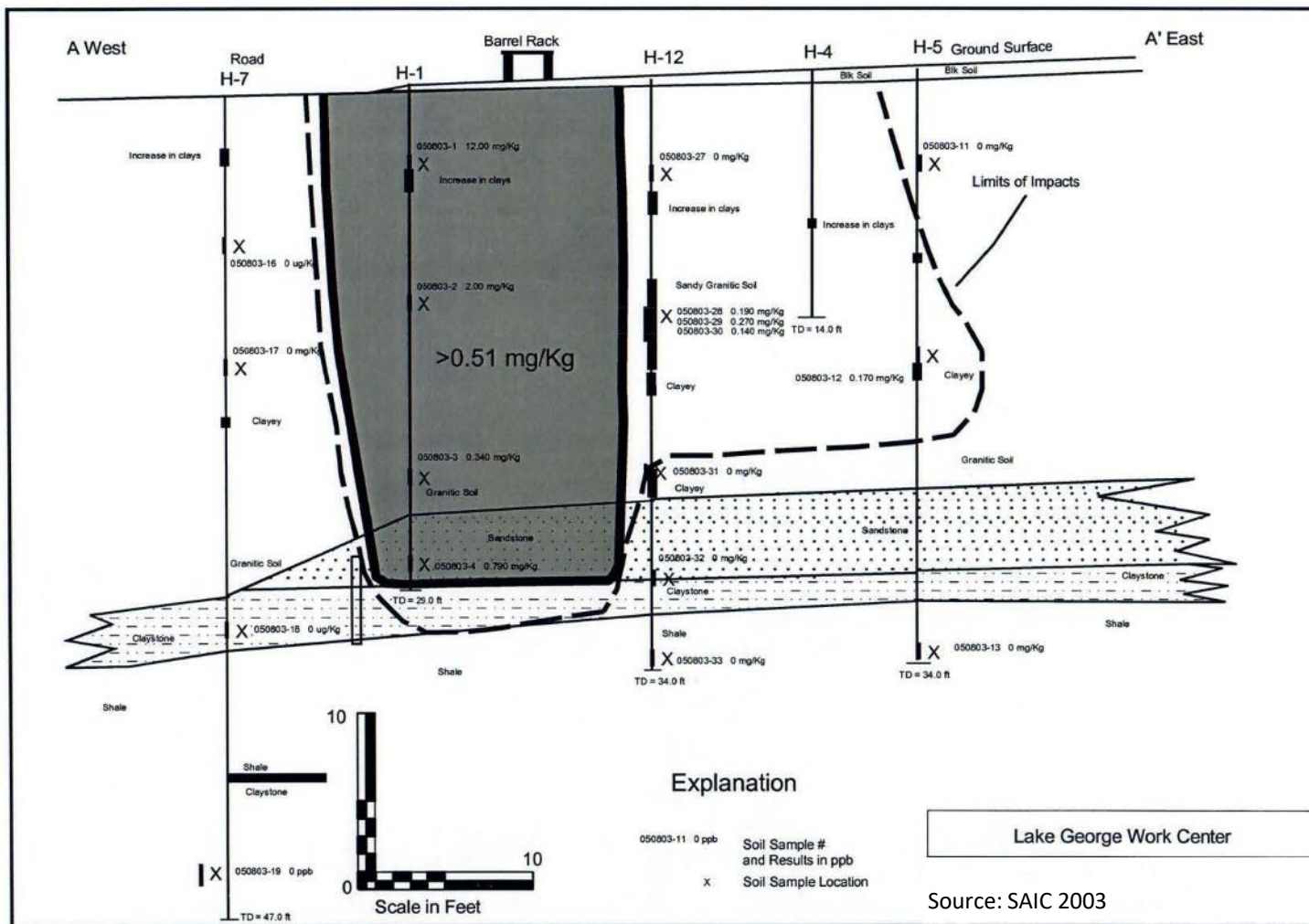


Figure 4-8 East-West Section Through Barrel Rack Impacted Area Showing Concentration of PCP

Lake George Work Center Preliminary Assessment

Lake George, Park County, Colorado

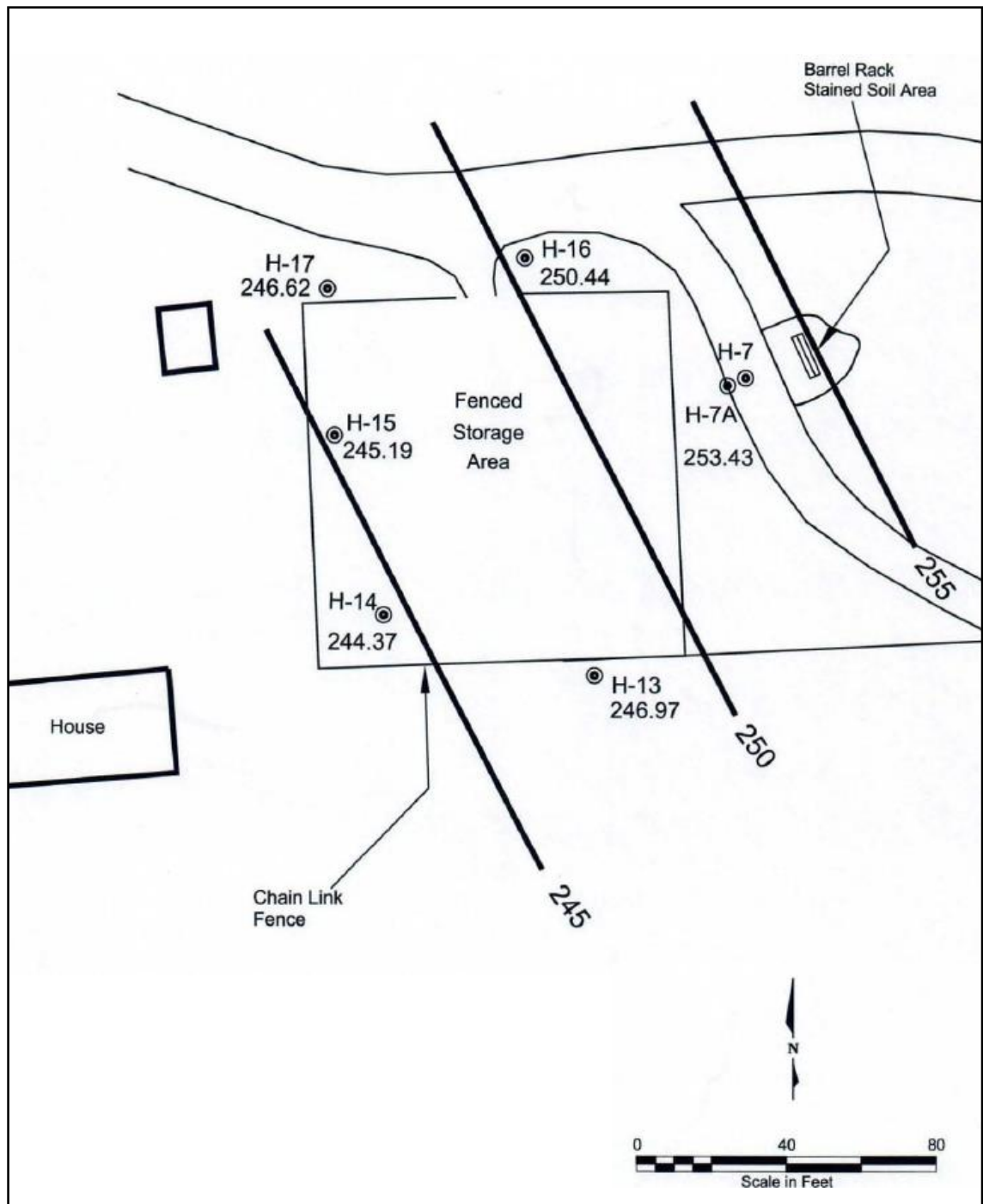
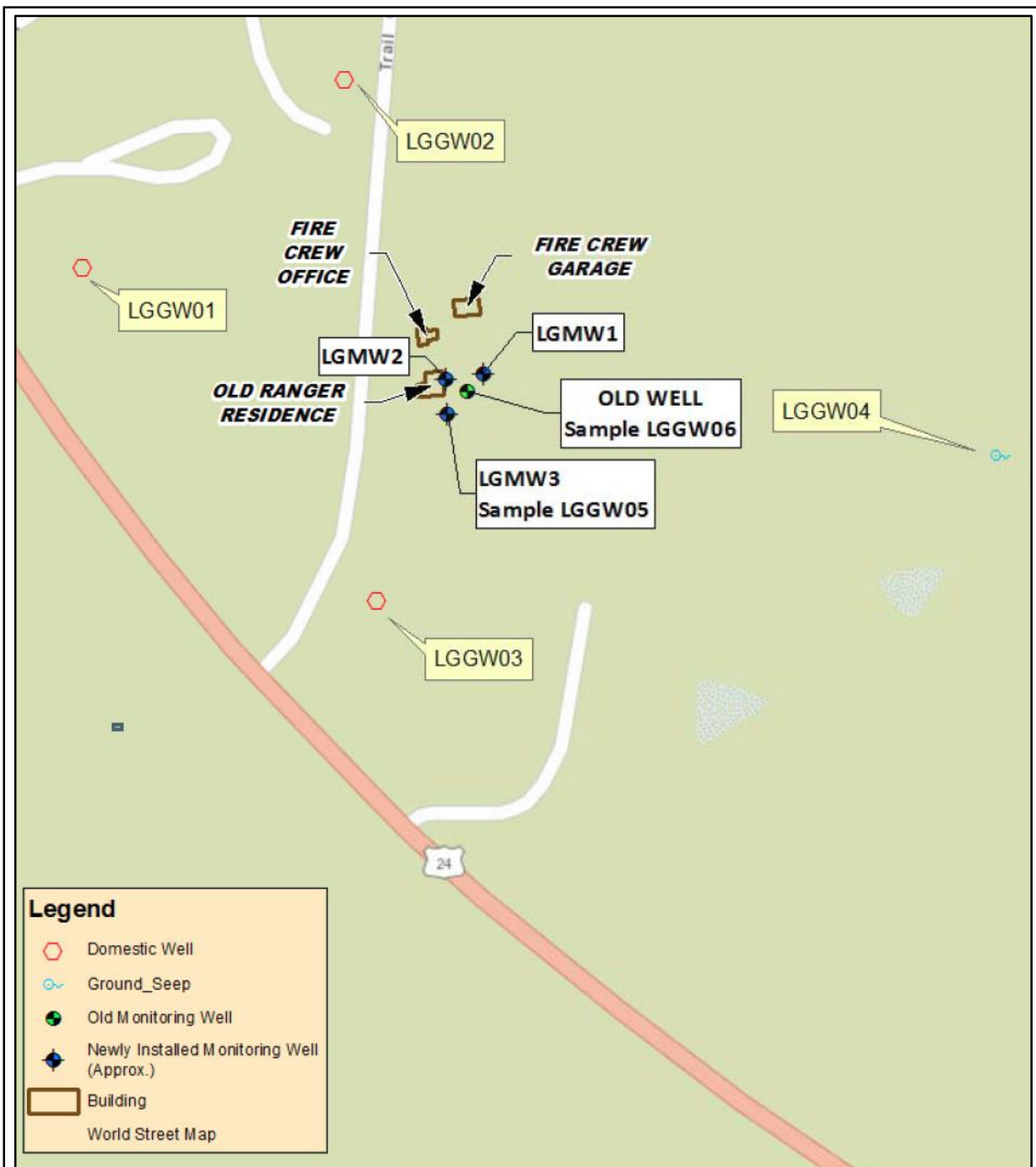


Figure 4-9 Groundwater Contours at the Barrel Rack (SAIC, December 2003)

Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado

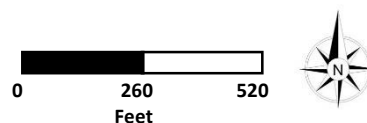


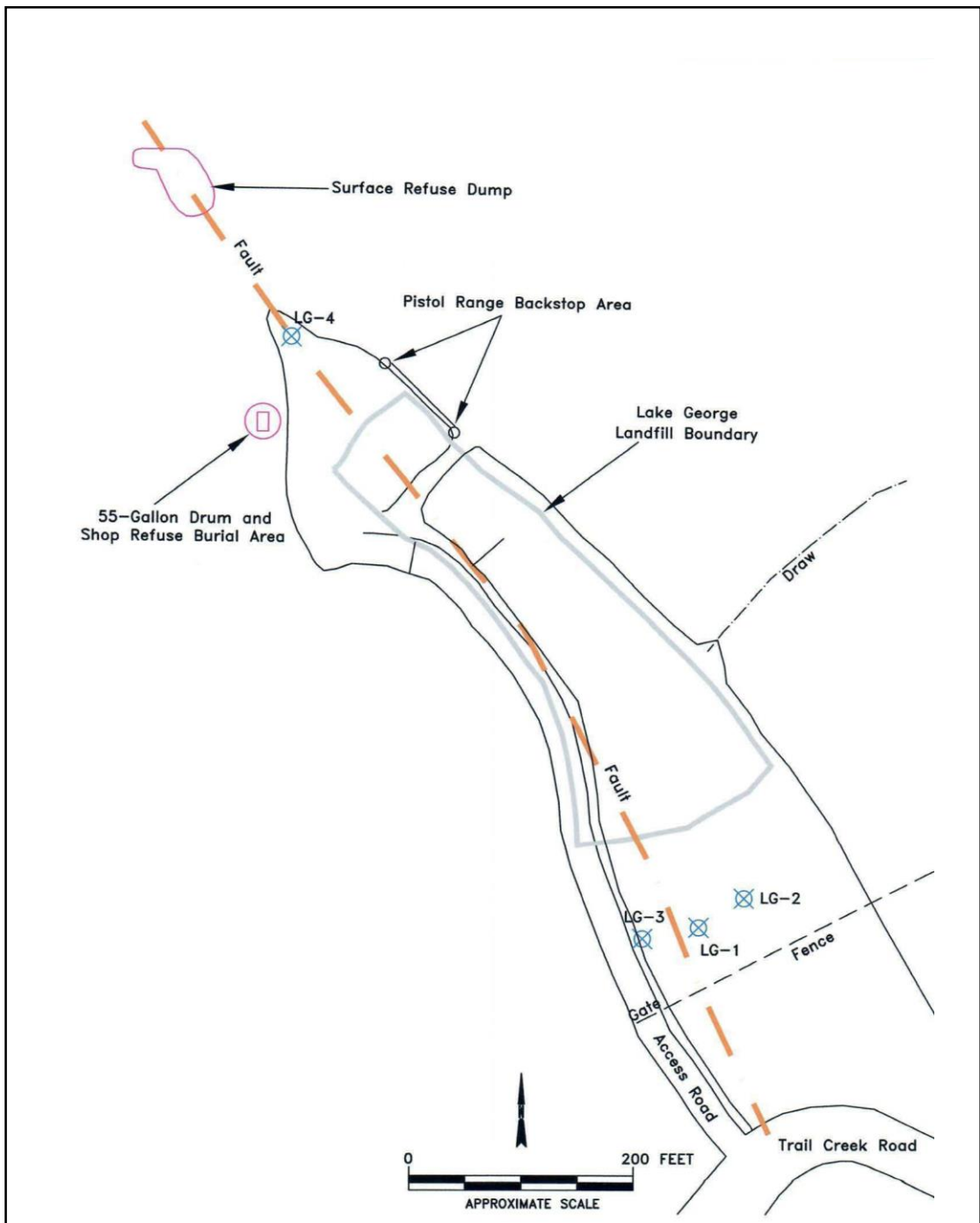
Source: USEPA START Contractor, Weston Solutions, April 8, 2016

Figure 4-10 USEPA Sampling Locations, March 2016

Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado

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Source: MSE 2007a

Figure 4-11 Lake George Landfill Features Map
 Lake George Work Center Preliminary Assessment
 Lake George, Park County, Colorado

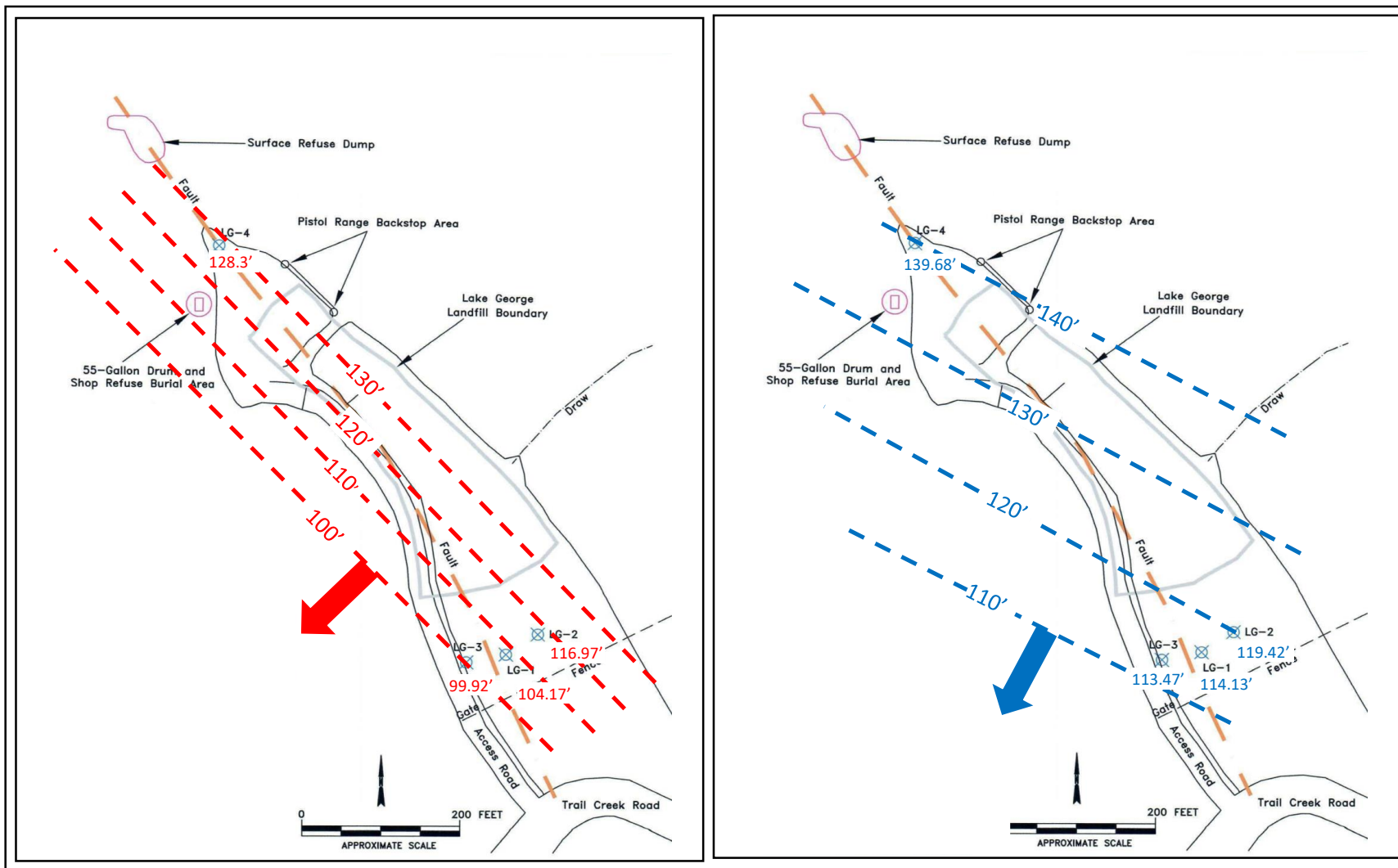


Figure 4-12 Seasonal Groundwater Contours at the Lake George Landfill

Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado



Well Icon and Well Name
Relative Groundwater Elevation
Groundwater Equipotential
(dashed line) with Estimated Flow
Direction (arrow) and relative water
elevation (number)
Red - October 11, 2006
Blue - May 22, 2007

LG-2
119.42'
99.92'
113.47'



5 CHEMICALS OF POTENTIAL CONCERN AND MEDIA OF POTENTIAL CONCERN

5.1 Chemicals of Potential Concern

The purpose of this PA is to evaluate whether Aroclor 1254 observed in well sediments in the Old Well has the potential to threaten human health or the environment at the Site. Aroclor 1254 was detected in sediments suspended in water samples from the Old Well at the Site between July 2011 and March 2016.

On July 6 and 7, 2017, contractors for the USFS conducted a removal action in accordance with 40 CFR 761.61(c) *Risk-based disposal approval*, which included grouting the casing of the Old Well through the perforated water-bearing portion (from total depth of 156 ft bgs to 49 ft bgs). The remaining 49 ft of casing was filled with bentonite chips to absorb the remaining water in the casing (see Section 4.3.14 of this report for details). This Removal Action is considered the final action for this site and no further CERCLA actions are recommended for PCBs in the Old Well.

In this PA, other contaminants have been documented in the historical review of previous environmental investigations presented in Section 4.3 and Section 4.4 of this document. Historically, environmental investigations and removal actions have evaluated the Lake George WC for TPH, VOCs, chlorinated volatile organic compounds (CVOCs), SVOCs, chlorinated herbicides (PCP and 2,4-D), EDB and metals. Previous investigations and associated Removal Actions have addressed other areas and contaminants of concern and no further CERCLA actions are recommended for these other chemicals.

5.2 Media of Potential Concern

5.2.1 Contaminated Water and Solids Contained in the Old Well

Between January 2016 and June 2016, the USEPA conducted an investigation to characterize Aroclor 1254 and other contaminants (VOCs, SVOCs, and other PCB congeners) in the study area, which included groundwater samples from adjacent onsite and offsite wells and an upgradient spring. The results of this investigation were presented by the USEPA Region 8 in a technical memorandum (Tran, Undated) and technical review meeting presentation (Tran, June 2, 2016):

- The USEPA Region 8 PCB Program concluded that PCBs in the (Old Well) were from a historical spill:
 - PCB capacitor in (an undocumented) submersible pump (that) was manufactured prior to 1979; or from
 - PCB contaminated soil (debris), which was found around the well (inside the well vault at approximately 4 ft bgs) in 2014.
- The USEPA Region 8 PCB Program concluded:



- The USFS needs to make additional effort to properly remove PCB contaminants from the bottom of the well;
- Surface soil removal and reconstruction of the well top, which was completed in 2014, should reduce or eliminate potential migration of PCBs from the ground surface to the well;
- Some PCBs are still in the well-vault based on the last sampling event;
- The PCB contaminants will continue to remain in the well, based on geological and hydrological conditions at this site;
- PCBs will not migrate in a groundwater plume; therefore, no monitoring wells should be required; and
- Further surface investigation may not be necessary because no historical use or storage of PCBs in the area has been documented.

Due to the hydrophobic nature of Aroclor 1254, the USEPA concluded that the likely source is an undocumented former pump that contained Aroclor 1254 in the oil-cooled capacitor. These pumps were common in the 1960s until about 1979. There are no records of any of the pumps used in the Old Well prior to the most recent pump being removed in 2014. The most recent pump, removed in 2014, did not contain PCBs. The USEPA concluded that no additional investigation of soil or groundwater media was necessary and recommended a downhole well video survey be completed. The USEPA concluded that the only significant media of potential concern were:

1. PCB-contaminated solids within the Old Well; and
2. Water contained within the Old Well casing with direct contact to the PCB-contaminated solids.

A well-casing video survey conducted of the Old Well (AI, September 1, 2016) identified extreme oxidation encrustation on the perforated well casing as the source of sediments at the bottom of the Old Well. The significance of these observations were:

1. It is unlikely that removing sediments from the bottom of the well will be effective in eliminating Aroclor 1254 from the water column if Aroclor 1254 is also sorbed to the well-casing material on the well-casing surface; and
2. Oxidation/encrustation on the casing walls also retards and mitigates the migration of Aroclor 1254 into the surrounding aquifer.

5.2.2 Groundwater

5.2.2.1 Assessment of PCBs in Groundwater

As described in Section 5.2.1, groundwater is not a significant pathway for the migration of Aroclor 1254, or other PCB congeners to onsite or offsite receptors. The USEPA has confirmed that PCBs in general, and Aroclor 1254 specifically, will not migrate in groundwater due to their (its) extremely low solubility (approximately 4.3×10^{-2} mg/L) and extremely high soil/water



partitioning coefficient (1.3×10^5 L/kg). Evidence of this is the result of the USEPA sampling event of surrounding wells in the Lake George study area.

The transport of Aroclor 1254 in groundwater is dominated by its chemical characteristics that make it (and all PCB molecules) adsorb to soil particles in a much larger ratio than remains dissolved in groundwater. The transport of organic chemicals in groundwater can be characterized, in part, by its chemical-specific organic chemical partitioning coefficient (K_d), which is described in the following equation 1:

$$\text{(Eq. 1)} \quad K_d = K_{oc} * f_{oc} = C_s / C_w$$

Where:

C_w is the concentration of a chemical in water [assume a maximum of 4.3×10^{-2} mg/L, which is the solubility limit (s)];

C_s is the concentration of a chemical in soil;

K_{oc} is the chemical-specific soil to water partitioning coefficient (1.3×10^5 L/kg for Aroclor 1254); and

f_{oc} is the ratio of organic carbon in the soil (assumed to be 0.001 or greater in most cases).

By re-arranging the constants in equation 1, we get equation 2:

$$\text{(Eq. 2)} \quad C_s = C_w * (K_{oc} * f_{oc})$$

Substituting for the conservative values for these parameters presented above:

$$C_s = (4.3 \times 10^{-2} \text{ mg/L}) * (1.3 \times 10^5 \text{ L/kg}) * 0.001; \text{ and}$$

$$C_s = 5.59 \text{ mg/kg.}$$

Assuming the conservatively (worst-case), that the entire water column in the Old Well was saturated with Aroclor 1254 to the solubility limit of 4.3×10^{-2} mg/L:

- Water column ($W_{\text{Old Well}}$) in the Old Well is total depth of the well ($TD_{\text{Old Well}}$, 155 ft bgs) minus the depth of the water table ($WT_{\text{Old Well}}$, 48.6 ft bgs), then
 - $W_{\text{Old Well}} = 155 \text{ ft bgs} - 48.6 \text{ ft bgs} = 106.4 \text{ ft.}$
- Water volume ($V_{w \text{ Old Well}}$) in the Old Well is the water volume in one foot of the Old Well saturated casing times the water column length (106.4 ft):
 - Volume in 1 ft of 6-inch ID casing is 1.47 gallons or 5.56 liters per ft; and
 - $V_{w \text{ Old Well}} = 5.56 \text{ liters/ft} * 106.4 \text{ ft} = 591.60 \text{ liters.}$
- Worst Case Mass of Aroclor 1254 in the Old Well ($M_{\text{Aroclor 1254 Old Well}}$) water column:
 - $M_{\text{Aroclor 1254 Old Well}} = V_{w \text{ Old Well}} * C_w \text{ at saturated; and}$
 - $= 591.60 \text{ L} * 4.3 \times 10^{-2} \text{ mg/L} = 25.44 \text{ mg}$
- Assuming a soil concentration at equilibrium of 5.59 mg/kg, this entire mass of Aroclor 1254 would be sorbed to less than 5 kg of soil (less than 3 L of soil at a bulk density of



greater than 1.6 kg/L) surrounding the Old Well, and would be completely stable and not migrate further in the aquifer.

This conservative model shows clearly that PCBs in the Old Well will not be transported through the aquifer, but will remain in the grouted well.

5.2.2.2 Groundwater Usage in the Study Area

Groundwater is the major source of potable water in the vicinity of Lake George. Figure 5-1 shows approximately 63 well permits have been applied for within 0.5-mile radius of the Work Center with a majority of those located in the town of Lake George, within 0.5 mile to the northwest. Most of these wells are small domestic wells or serve single businesses, though several may be environmental extraction wells. The Lake George Charter School well serves approximately 133 students by permit. The Lake George Municipal well serves the Sheriff's Department and Road and Bridge Department among others. At least four wells were for remediation of groundwater, according to the application.

Regionally, groundwater is in the fractured granitic aquifers east of the Site, and in sedimentary alluvial deposits associated with the South Platte River located beneath the Work Center and the town of Lake George. The granitic aquifers are located to the east-northeast of the Site. Water is expected to travel southwest along the shallow bedrock interface following the topographic gradient and more slowly along fractures in the granitic bedrock. Groundwater contours observed at former wells located at the Barrel Rack (Figure 4-9) and at existing wells located at the Lake George Landfill (Figure 4-12) agree with these general hydrologic principles. Land associated with the granitic aquifers immediately upgradient from the Work Center is owned by the USFS and is unimproved. The USFS Supply Well (permit number 288032, completed June 28, 2012, perforated between 110 ft bgs and 305 ft bgs) is located approximately 1,500 east of the Work Center, with a yield of 2 gpm, within the fractured granitic aquifer. It is located approximately 1,000 ft east of the Work Center and 50 ft higher in elevation, along the southern drainage identified in Figure 5-1.

Most wells in the Lake George region draw from water in the sedimentary alluvial aquifers associated with the South Platte River. The Old Well at the Site is expected to draw water from these sediments, though no records have been found to document the lithology that the well is completed in. Pumping conducted by the USFS (Abaci 2014) indicate a yield of 4.8 gpm as compared to the 2 gpm yield of the Well 288032. According to a cross section developed by the Colorado Geological Survey (CGS), the total depth of the alluvial sediments is greater than 200 ft, with bedrock basement elevations lower than 7,800 ft above mean sea level (amsl) and bordered to the west by an east-west trending block fault. Groundwater in these lower sedimentary layers may be trapped within this sedimentary basin, or may migrate along topographic gradient to the South Platte as shown by the CGS Figure 5-2. Private supply wells in the town of Lake George appear to be also drawing water from the alluvial sediments associated with the South Platte River. Due to the complex sedimentary layering of the alluvial sediments, it is anticipated that gravels, sands and clays and fractured shale and sandstone are



interlayered to develop preferential pathways for groundwater to travel along sands/gravel and fractured layers and confining conditions in the fine sedimentary silts and clays.

5.2.3 Soil

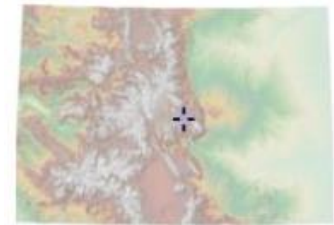
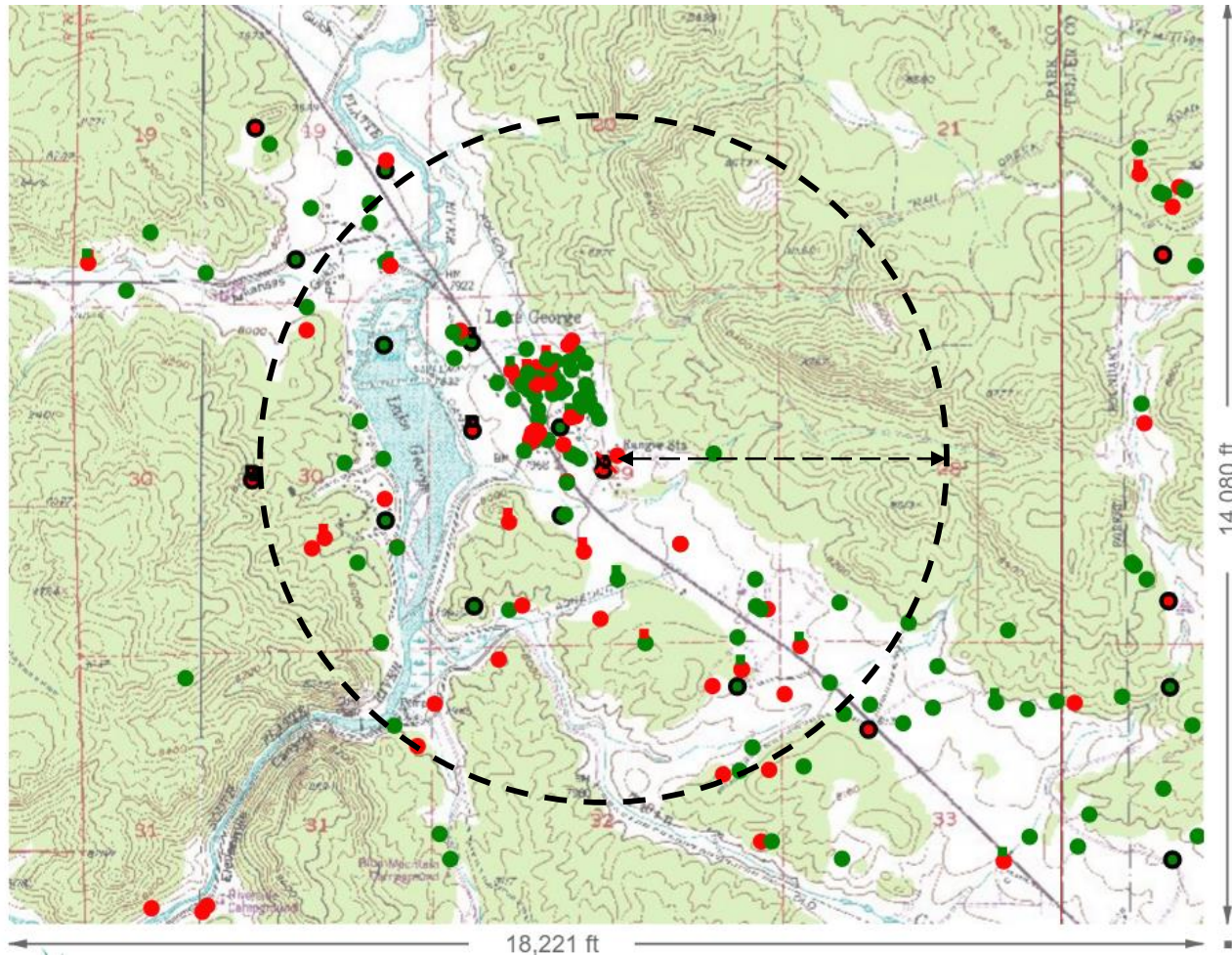
As described in Section 5.2.1, the USEPA investigation concluded that soil is not a likely source of PCB contamination that will threaten human health or the environment in the future. The USEPA concluded that PCBs detected in water from the Old Well likely originated from an undocumented pump that has since been removed from the Old Well; or from debris within the former Old Well vault, which was removed in 2014. The USEPA also concluded that further surface investigation is not necessary because no historical use or storage of PCBs in the area has been documented.

5.2.4 Surface Water

As described in Section 5.2.1, the USEPA investigation concluded that surface water is not a likely source of Aroclor 1254 contamination that will threaten human health or the environment in the future. The USEPA concluded that Aroclor 1254 detected in water from the Old Well likely originated from an undocumented pump that has since been removed from the Old Well; or from debris within the former Old Well vault, which was removed in 2014. The USEPA also concluded that further surface investigation may not be necessary because no historical use or storage of PCBs in the area has been documented.

Based on USEPA's investigation and an assessment of surface water in the study area, surface water is not considered a significant media of concern at the Site. A drainage valley is located east of the Work Center, in which the spring-box water source is located. This drainage passes east of the Work Center, then through the southern adjacent property and eventually deposits run-off water into the South Platte by Lake George (see Figure 5-3). The second drainage is located north of town and runs through the pass adjacent to the Lake George Landfill on Trail Creek Road, along Imboden Street, then empties into the lake (see Figure 5-3). Neither of these drainages flow continuously and are generally dry except for periods of run-off.

During periods of high rainfall, overland run-off may occur at the Site; however, PCBs will not be transported from the abandoned Old Well.



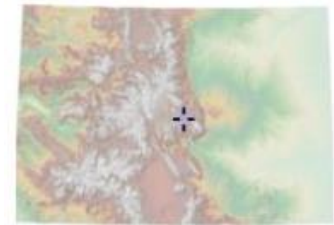
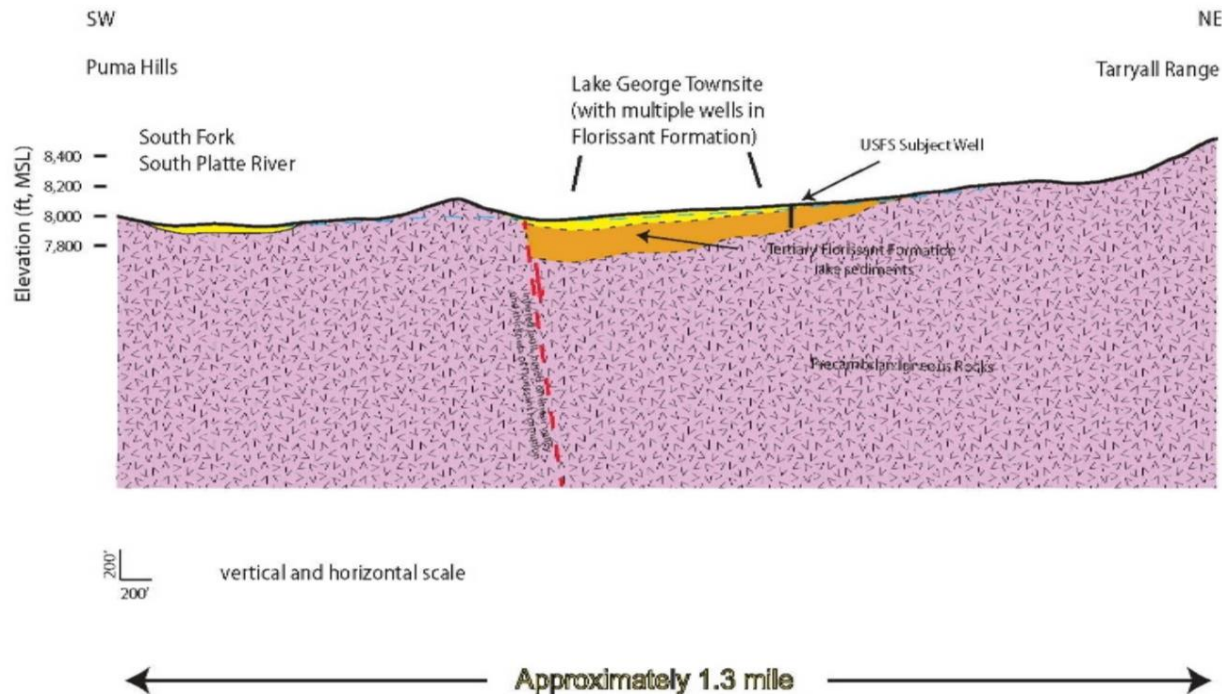
Lake George Location Map
Colorado

- Well Applications and Well Completion Information available
- Well Applications available only

Well data from Colorado Division of Water Resources, Department of Natural Resources, AQUAMAP, 03/17/2016.

Figure 5-1 Regional Water Well Applications within 1 Mile Radius
Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado





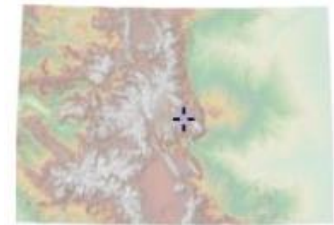
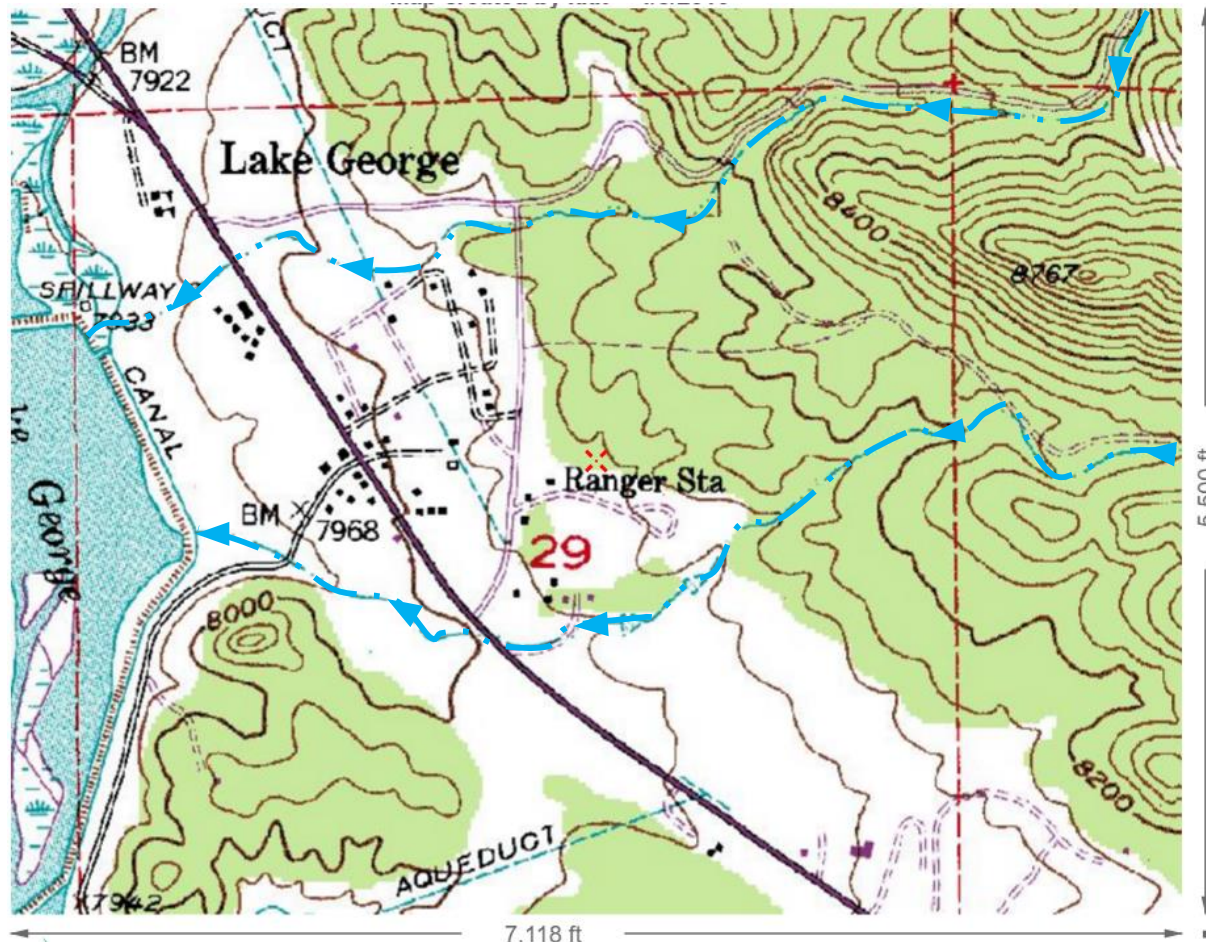
Lake George Location Map
Colorado

Lake George sits above a paleo-valley incised into Precambrian granite. The sediments and granite are locally mantled with Quaternary alluvium. Water wells in the area tap the fine grained lake sediments and , to a lesser extent, fractured granite. Well logs from water wells describe water-bearing fractures in the Florissant Formation shales and mudstones

Source: Colorado Geological Survey

Figure 5-2 Regional Cross-Section, Lake George Work Center

Lake George Work Center Preliminary Assessment
Lake George, Park County, Colorado



Lake George Location Map
Colorado

Surface Water Run-off
Flowlines Following Historic
Creek Beds

Source: Colorado Division of Water Resources, AquaMap, 2016

Figure 5-3 Regional Surface Water Drainage, Lake George Work Center

Lake George Work Center Preliminary Assessment

Lake George, Park County, Colorado

 APPLIED INTELLECT





6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The purpose of this PA report was to evaluate potential sources and migration pathways of PCBs detected in the Old Well water at the Lake George Work Center between July 2011 and December 2016. In doing so, this PA concludes that:

- The original source of PCBs in the Old Well was likely:
 - An undocumented oil-cooled pump that was manufactured prior to 1979, which has since been removed from the well; or
 - Debris in the former Old Well underground vault, which was removed and the vault filled in 2014.
- The Removal Action conducted on July 6 and 7, 2017, abandonment of the Old Well by grouting through the screened interval (from 156 ft bgs to 49 ft bgs) and filling the remainder of the casing with hydrated bentonite chips, has eliminated any current and future migration pathways and exposure routes to PCBs detected in the Old Well sediments.

6.2 Recommendations

Based on the conclusions provided above, it is recommended that No Further Action is needed to protect human health and the environment from PCBs in the Lake George Work Center Old Well. In addition, No Further Action is needed to address other chemicals evaluated in this PA.



7 REFERENCES

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APPENDIX A

Photo-Documentation

03.30.16 - Lake George Work Center Site Visit Pictures

1. Former USFS Supply Well 'Old Well' – SW Facing



2. Former USFS Supply Well 'Old Well' and Monitoring Stations (LGMW1, LGMW2, LGMW3) – SW Facing



3. Former USFS Supply Well 'Old Well' and Monitoring Stations (LGMW1, LGMW2, LGMW3) – SW Facing



4. USFS Storage Yard Example of Down Gradient – South Facing



5. USFS Storage Yard Example of down gradient – South Facing



6. Private Residence Adjacent to WC – South East Facing



7. Private Residence Adjacent to WC – South Facing



8. Private Residence Adjacent to WC – South West Facing



9. Private Residence Adjacent to WC – South Facing



10. Private Residence Adjacent to WC – South Facing



11. Private Residence Adjacent to WC – South Facing



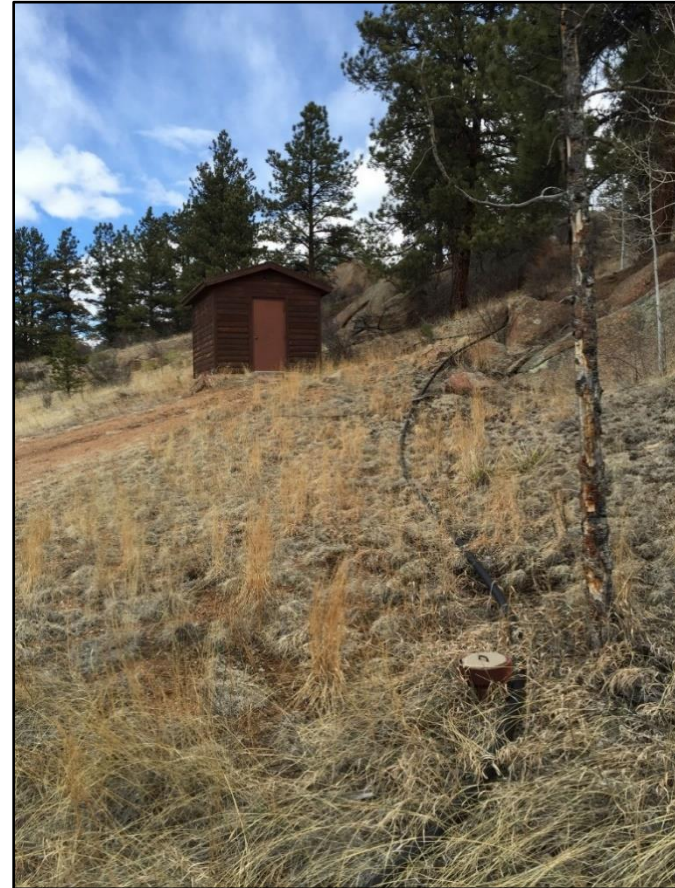
12. Burn Surface – North Facing



13. Burn Surface – North Facing



14. Active Water Treatment Shed – North West Facing



15. Valve – East Facing



16. Dry Spring Box – South East Facing



17. Valve – South East Facing



18. USFS Sheds – South West Facing



**19. Former Landfill – Groundwater Monitoring Wells LG-1, LG-2, LG-3
North East Facing**



**20. Former Landfill – Groundwater Monitoring Wells LG-1, LG-2, LG-3
East Facing**



21. Former Landfill – Groundwater Monitoring Well LG-4 North Facing



22. Former Landfill – Groundwater Monitoring Well LG-4 North Facing



July 6 to 7, 2017 - Lake George Work Center Well Abandonment Pictures

1. Soil pile used as backfill source for reclamation



2. Grouting setup at Old Well



3. Electrical box with note from Old Well excavation



4. Old Well cut-off, abandonment excavation



5. LGMW-1 cut-off, abandonment excavation



6. LGMW-2 abandonment excavation with well intact



7. LGMW-3 abandonment excavation



8. LGMW-3 abandonment excavation



9. Old Well and LGMW-2 surface restoration (LGMW-2 in background)



10. LGMW-3 surface restoration





APPENDIX B

Interview/Call Documentation

Date: March 18, 2016

Time: 3:15 PM

Who was called: Kurt Muenchow, US Forest Service, Lake George Work Center

Subject of Call/Visit: Interview Mr. Muenchow regarding activities associated with site investigations and removal actions at the Lake George Work Center and Lake George Landfill and potentially contaminating activities in Lake George that may have impacted the Work Center Groundwater CO

Details:

Jeff Hart met with Mr. Muenchow at the USFS Regional Office to review hard copies and electronic copies of documents associated with the Lake George Work Center. Mr. Muenchow had been the OSC for the SAIC and URS site investigations and removal actions that occurred at the Lake George Work Center in 2003 and 2004. He was also the OSC for SAIC and MSE site investigations and removal actions which occurred at the Lake George Landfill in 2006 and 2007.

- Mr. Muenchow indicated that there was the possibility that the local utility had a transformer storage yard in the Lake George area.
- He recommended interviewing members of the Coalition of Upper South Platte (CUSP), located at Lake George to identify any potentially responsible parties.
- He also recommended conducting a site visit to the Lake George Work Center boneyard that had been the location of a removal action for PCP and 2,4-D in 2003-2004. He suspected that samples were analyzed for PCBs during that investigation. (upon further review, it was determined that PCBs were not analyzed in groundwater or soil samples conducted during the 2003-2004 activities).
- He recommended visiting the Lake George Landfill and evaluating reports associated with the removal actions and sampling events there in 2006-2007 by SAIC and MSE.
 - AI determined that four wells were installed at the Landfill and these wells were sampled for PCBs in 2007 with no PCBs detected.
- Mr. Muenchow recommended AI review activities and potentially polluting debris located at the private landowners directly south of the Lake George Work Center, and directly east and North of the Work Center.
- Finally, Mr. Muenchow recommended AI interview Mr. Wayne Baker, former US Forest Service employee, located at the Lake George Work Center. Unfortunately, Mr. Baker has retired and was not available for the interview.

Date: March 30, 2016

Time: 12:15 PM

Who was called: Jerry Thompson, US Forest Service, Lake George Work Center

Subject of Call/Visit: Interview Mr. Thompson regarding potentially contaminating activities in Lake George that may have impacted the Work Center Groundwater CO

Details:

Jeff Hart, Hilary Williams and Todd Knoedler visited Mr. Thompson at 12:15 PM on Wednesday, March 30, 2016 at the Lake George Work Center in Lake George Colorado to ask for information related to possible Intermountain Rural Electrical Association (IREA) storage facilities in the vicinity of Lake George. Mr. Thompson indicated that he had worked at the Work Center since 2004 and was not aware of any transformers stored onsite or in the vicinity. He did note a temporary pole-mounted transformer was installed for a short period in the vicinity of the boneyard in 2004, but it was only present for a short time and was then taken offsite.

Mr. Thompson also indicated that the onsite groundwater monitoring wells had been sampled by contractors of the EPA on March 28 and 29, 2016. He mentioned that two wells had obstructions and were not sampled for PCBs.

Date: March 31, 2016

Time: 2:15 PM

Who was called: Coalition for the Upper South Platte, Beth Nielson

Subject of Call: Potentially Responsible Parties associated with pollution/PCB Sources in Lake George CO

Details:

Jeff Hart, Hilary Williams and Todd Knoedler visited CUSP at 1:00 PM on Wednesday, March 30, 2016 at their Headquarters in Lake George Colorado to ask for information related to possible Intermountain Rural Electrical Association (IREA) storage facilities in the vicinity of Lake George. Ms. Nielson indicated that Ms. Carol Ekarius, Executive Director of CUSP was unavailable at that time but would possibly have the information needed. Mr. Hart left his card and Ms. Nielson offered to inform Ms. Ekarius to contact Mr. Hart via telephone when she was available.

On March 31, 2016, Mr. Hart emailed a map of Lake George to CUSP with a request for any potentially contaminating historical locations to be documented and returned for the PA. He called and spoke to Beth Nielson regarding further discussion with Ms. Ekarius.

On April 1, 2016, Ms. Ekarius contacted Mr. Hart by phone and offered the services of her assistant, Ms. Lisa Patton, a long-time resident of Lake George, CO to provide her input on the Map provided. Ms. Patton provided an annotated map with two locations designated:

- A possible IREA storage yard located at the top of the ridge located north east of the Lake George Work Center; and
- An abandoned quarry with one or more abandoned cars located in it, located approximately 3,500 ft northwest of the Lake George Work Center.

Discussions of both these locations were included in the text of the Lake George Work Center Preliminary Assessment.

Date: April 1, 2016

Time: 10:45 AM

Who was called: Hazardous Materials and Waste Management Division, Colorado Department of Public Health and Environment

Subject of Call: Inquiry about possible storage facilities in or around the vicinity of Lake George, Colorado

Details:

Hilary Williams contacted the Hazardous Materials and Waste Management Division (HMWMD) of the Colorado Department of Public Health and Environment (CDPHE) by phone at 10:45 AM on April 1, 2016. She left a message that asked for assistance in locating any historical documents regarding a storage area or lot in the town or vicinity of Lake George, Colorado. CDPHE did not return this phone call.

Ms. Williams submitted a records review request on the CDPHE website for any HMWMD CDPHE records in Lake George, Colorado.

- CDPHE received the records review request and emailed confirmation to Ms. Williams at 1:40 PM on April 1, 2016.
- CDPHE public review research specialist Pearl Campos emailed Ms. Williams at 2:50 PM on April 1, 2016. Ms. Campos reported the HMWMD record center did not have any records pertaining to Lake George Work Center.
- Ms. Williams responded by email to ask Ms. Campos if the HMWMD had any records for the town of Lake George at 7:30 PM on April 1, 2016.
- Ms. Campos emailed Ms. Williams at 8:00 AM on April 4, 2016, to report records of a Lake George transfer station. Ms. Campos attached one Lake George transfer station document and offered to send Ms. Williams additional electronic files if needed.
- Ms. Williams emailed Ms. Campos at 12:00 PM on April 4, 2016, to explain the information she provided was sufficient and no further action is needed.

Date: April 1, 2016

Time: 10:45 AM

Who was called: Intermountain Rural Electric Association, Alan McDowell

Subject of Call: Inquiry about possible Intermountain Rural Electrical Association (IREA) storage facilities in the vicinity of Lake George, Colorado

Details:

Hilary Williams contacted IREA Sedalia Headquarters by phone at 10:45 AM on April 1, 2016. IREA customer service directed her to Mr. Alan McDowell of the Woodland Park Office. Ms. Williams left a message on Mr. McDowell's voicemail that asked if the IREA had any historical documents regarding a storage area or lot utilized by IREA in the town or vicinity of Lake George, Colorado.

Mr. McDowell returned the message by phone and left a message on Ms. Williams voicemail at 11:45 AM on April 1, 2016. He reported employment at IREA for over 30 years and had no knowledge of a storage lot in the Lake George area, adding IREA storage is usually in Woodland Park.

This correspondence was included in the text of the Lake George Work Center Preliminary Assessment.

Date: April 8, 2016

Time: 3:30 PM

Who was contacted: Todd Knoedler, OSC Pike/San Isabel NFs

Subject of Inquiry: Specifications of the Old Well at the Lake George Work Center, including Well Vault and Pump

Details:

Jeff Hart contacted Todd Knoedler by email, referencing Mr. Hart's notes from the team site visit to the Lake George Work Center and Lake George Landfill on March 30, 2016. Mr. Knoedler had provided a discussion on the information he had learned from the well, vault and pump, when the well pump was pulled in 2013 (Old Well, Lake George Work Center).

On April 11, 2016, Mr. Knoedler responded with notes from the event, transcribed below:

Down-hole well equipment was removed by a licensed well driller (CO No. 1381) on 28 JUN 2013 from 0915-1030 hours under the oversight of Don Lira and Todd Knoedler. The following data was collected during this action:

Well Construction and Down-Hole Data:

Well Vault Construction: 5'W x 5'L x 6.6'D treated wood, earthen floor, 21-in. square manhole (constitutes confined space).

Depth of Vault from Ground Surface to top of casing (TOC): 6.63'

Total Well Depth (from TOC): 148.88'

Total Well Depth (from ground surface [GS]): 155.51'

Surface Casing Diameter: 6" ID, constructed of thin, deteriorated stove pipe.

Screen Length, Diameter, Slot Size, Sump: Unknown – most likely none.

Water Level Below GS: 49.51' (99.37' column of water in well).

Annulus Dimensions: Unknown, original borehole likely 6".

Volume of Water in Well (following equipment removal, not equilibrated): 146-gal.

Pump Type and Voltage: Sta-Rite 10GPM, 220V, Code 10SP4D02H, DOM: May 2008

Return Conduit Diameter, Length, Material: One 11'x1.25"ID Galv., Six 20'x 1" ID PVC.

Pump Set (screen depth) at: 138.6' below GS



APPENDIX C

Well Permit Documentation, Selected Lake George Supply Wells

WRS-66
20-11-65

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF THE STATE ENGINEER

OCT 16 1967

Index No. _____
IDWD 1-23
Use 1
Registered _____

MAP AND STATEMENT FOR WATER WELL FILING

PERMIT NUMBER 32157

STATE ENGINEER

Know all men by these presents: That the undersigned David A. Scherf,
claimant(s), whose address is _____, City Lake George, Calo.,
states: Claimant(s) is (are) the owner(s) of well No. 32157 located as shown on the map below; the
total number of acres of land owned by him (them) to be irrigated from this well is NONE; work
was commenced on this well by actual construction 21 day of Sept 1967; the
tested capacity of said well is 25 (gpm) (cfs), for which claim is hereby made for Domestic
purposes; that the average annual amount of water to be diverted is 2 1/2 P.M. acre-ft.; and that the
aforementioned statements are made and this map and statement are filed in compliance with the law.

State of Colorado)
County of _____) ss

Claimant(s)

Subscribed and sworn before me this _____ day of _____, 19____.

My Commission expires _____

Notary Public

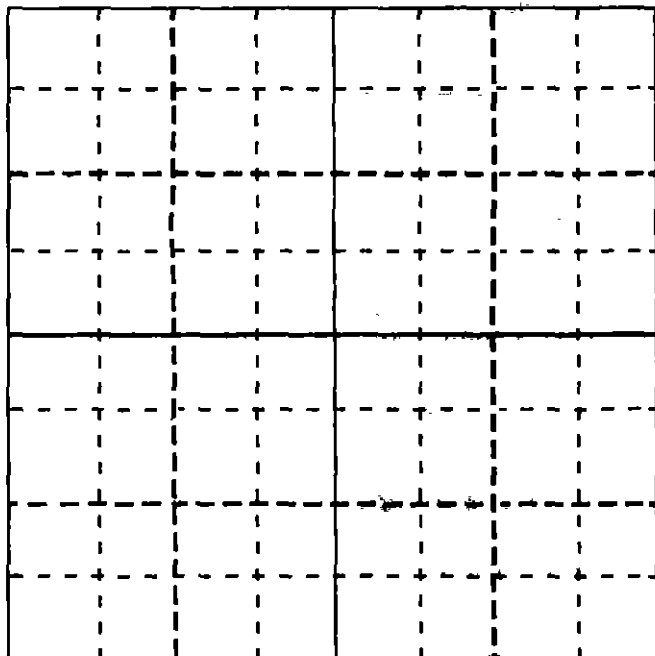
MAP

THE WELL SHALL BE LOCATED WITH REFERENCE TO GOVERNMENT SURVEY CORNERS OR
MONUMENTS, OR SECTION LINES BY DISTANCE AND BEARING.

_____ feet from _____ (North or South) section line
_____ feet from _____ (East or West) section line

IF WELL IS FOR IRRIGATION, THE AREA TO BE IRRIGATED MUST BE SHADED OR CROSS-
HATCHED.

The square below will be used to indicate the location of the well and the irrigated land.



WELL LOCATION

Park 47 County
SE 1/4 NW 1/4, sec. 29
T. 12S, R. 71W, 6 P. M.

Ground Water Basin _____
Water Management
District _____

Domestic wells may be located by the
following: LOT 10, BLOCK _____

Town S of Lake George SUBDIVISION

ACCEPTED FOR FILING IN THE OFFICE OF THE STATE ENGINEER OF COLORADO ON THIS
_____ DAY OF _____, 19____.

State Engineer

LOG AND HISTORY

WELL LOG

Ground Elevation 9100Type Drilling Cable Tool Rig

From	To	Type of Material	Water Loc.	Perf.
0	5	Surface		
5	22	gray lime stone		
22	51	gray sandstone		
51	87	Black shale		
87	92	Water sand		
92	125	Black shale		

WELL DATA

Date Started Sept 21-1967Date Completed 11 22-1967

Hole Diameter:

7 in. from 0 ft. to 125 ft.
 _____ in. from _____ ft. to _____ ft.
 _____ in. from _____ ft. to _____ ft.

CASING RECORD

Cemented from _____

GL Plain Casing 125
 Size 6, kind 1/2 from 0 ft. to 125 ft.

Size _____, kind _____ from _____ ft. to _____ ft.

Size _____, kind _____ from _____ ft. to _____ ft.

C Perforated Casing 1/4
 Size 6, kind 1/2 from 87 ft. to 101 ft.

Size _____, kind _____ from _____ ft. to _____ ft.

Size _____, kind _____ from _____ ft. to _____ ft.

TEST DATA

Date Tested Sept 22-1967

Type of Pump _____

Length of Test 3 hoursConstant Yield 2 1/2 P.M.Drawdown 125

PUMP DATA (To be filled in)

Type of Pump _____

Outlet Size _____

Driven by _____

Horsepower _____

Use additional paper if necessary to complete log and attach.

WELL DRILLERS STATEMENT

State of Colorado)
 County of _____) ss

DEPTH TO WATER 87 ftTOTAL DEPTH 125 ft

_____ being duly sworn, deposes and says: he is the driller of the above described well; he has read the above map and statement, knows the content thereof, and the same is true of his own knowledge.

Ray Smirnov

License No. 484Subscribed and sworn to before me this Oct 13 day of Oct 13, 1967.

My Commission expires _____, 19____.

Notary Public

FORM TO BE MADE OUT IN QUADRUPLICATE:

Original WHITE (both sides) & Triplicate GREEN Copy must be filed with the State Engineer within 30-days after well is completed. Duplicate PINK copy is for the Owner & YELLOW copy for the Driller. WHITE FORM MUST BE AN ORIGINAL COPY ON BOTH SIDES AND SIGNED.

STATE OF COLORADO

APPLICATION FOR:

- ☒ A PERMIT TO USE GROUND WATER
☒ A PERMIT TO CONSTRUCT A WELL
☐ OTHER

Application must be completed satisfactorily before acceptance

SEP 22 1967
 WATER SECT.
 COLORADO
 STATE ENGINEER

PRINT OR TYPE

LOCATION OF WELL

APPLICANT Gerald A. ChondCOUNTY Pack

Street Address _____

SE 1/4 NW 1/4, sec. 29City & State Lake George, Colo.T. 12 S., R. 71W, 2 P.M.Use of ground water Domestic

Ground Water Basin _____

Owner of land on which well _____

Water Management _____

is located Gerald A. Chond

District _____

Number of _____

acres to be irrigated NoneUSE DIAGRAM ON THE BACK OF THIS SHEET TO
LOCATE WELL.

Legal description of _____

irrigated land _____

Other water rights on _____

this land None

Owner of irrigated _____

land _____

Aquifer(s) ground water is to be obtained _____

from _____

Driller Ray Smith No. 484

Driller's _____

Address Green Mts. Falls, Colo

ESTIMATED WELL DATA

Signature of Applicant _____

Est. quantity of ground water to be claimed:

CONDITIONS OF APPROVAL

Est. Max. Yield 5 GPM or CFS

Est. average annual amount to be

used in acre-feet _____

Storage capacity None AFAnticipated start of drilling Sept 21 1967

Hole Diameter:

7 in. from 0 ft. to 6 ft.

_____ in. from _____ ft. to _____ ft.

Casing:

Plain 6 in. from 0 ft. to 6 ft.

_____ in. from _____ ft. to _____ ft.

Perf. 6 in. from 48 ft. to 60 ft.

_____ in. from _____ ft. to _____ ft.

PUMP DATA:

Outlet

Type _____ HP _____ Size _____

This application approved

PERMIT NUMBER 32157DATE ISSUED SEP 22 1967

[Signature]
 State Engineer

[Signature]
 by

This application approved

CONDITIONAL PERMIT NO. _____
 (Permit good for one (1) year after date
 of issuance)

DATE ISSUED _____

Chairman Ground Water Commission

by _____

(OVER)

THE LOCATION OF THE PROPOSED WELL SHALL BE SHOWN ON THE DIAGRAM BELOW. THE LOCATION WILL BE INDICATED BY THE DISTANCES FROM THE SECTION LINES, OR THE DISTANCE AND BEARING FROM GOVERNMENT SURVEY CORNERS OR MONUMENTS.

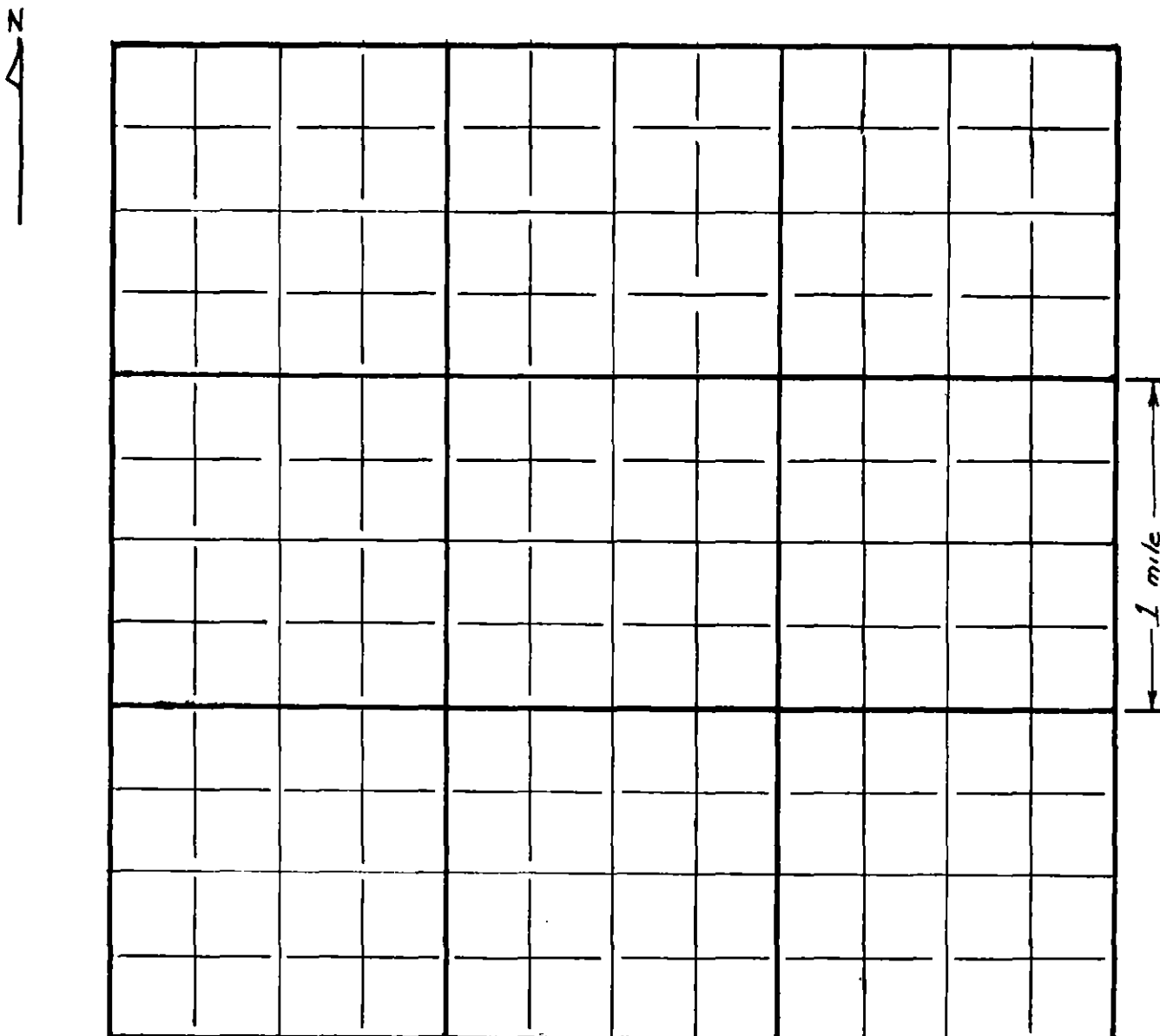
IF WELL IS FOR IRRIGATION, THE AREA TO BE IRRIGATED MUST BE SHADED OR CROSS-HATCHED.

Domestic wells may be located by the following:

Lot 10 Block _____ Street Address _____

Town site of Lake George or city Colo,
Subdivision of

The diagram represents nine (9) sections. Use the center square (section) to indicate the location of the well.



THE SCALE OF THE DIAGRAM IS TWO INCHES EQUALS ONE-MILE

WELL HOLE

THIS FORM MUST BE SUBMITTED
WITHIN 60 DAYS OF COMPLETION
OF THE WORK DESCRIBED HERE-
ON. TYPE OR PRINT IN BLACK
INK.

COLORADO DIVISION OF WATER RESOURCES

1313 Sherman Street - Room 818
Denver, Colorado 80203

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 100039

RECEIVED

JUL 13 '78

WATER RESOURCES
STATE ENGINEER
COLD

WELL OWNER Jane Pederson

ADDRESS 4177 S. Washington
Englewood, Colorado 80110

DATE COMPLETED May 23, 1978

SE 1/4 1/4 of the NW 1/4 1/4 of Sec. 29
T. 12 S. R. 71 W. 6th P.M.

WELL LOG

From	To	Type and Color of Material	Water Loc.
0'	40'	Sand, Clay, Gravel, Unconsolidated	40'
40'	95'	Clay, Oil Shale	65' 80'
TOTAL DEPTH <u>95'</u>			

Use additional pages necessary to complete log.

HOLE DIAMETER

7 7/8 in. from 0' to 20' ft.

6 in. from 20' to 95' ft.

 in. from to ft.

DRILLING METHOD Air Percussion

CASING RECORD: Plain Casing

Size 6 5/8 kind Steel from 0' to 20' ft.

Size 4 & kind plastic from 10' to 35' ft.

Size & kind from to ft.

Perforated Casing

Size 4 & kind plastic from 35' to 95' ft.

Size & kind from to ft.

Size & kind from to ft.

GROUTING RECORD

Material Cement

Intervals 0-20

Placement Method Poured

GRAVEL PACK: Size

Interval

TEST DATA

Date Tested May 23, 1978

Static Water Level Prior to Test 28' ft.

Type of Test Pump Air

Length of Test 1 hr.

Sustained Yield (Metered) 4 GPM

Final Pumping Water Level Drilled with air-
percussion, no draw down.

Colorado Division of Water Resources

Colorado's Well Permit Search

THIS PAGE IS NOT THE ACTUAL PERMIT

The information contained on this page is a summary of the permit file and may not reflect all details of the well permit. ([Full Disclaimer](#))

Well Constructed

[Help](#)

Last Refresh: 2/1/2016 12:01:24 AM

Receipt: 0093262 **Division:** 1
Permit #: 100039- - **Water District:** 23
Well Name / #: **County:** PARK
Designated Basin: **Management District:**
Case Number:
WDID:

[-] Imaged Documents - Permit File

Document Name	Date Imaged	Annotated
Original File	12/05/2007	No
Original File	12/05/2007	No

[-] Applicant/Contact

Applicant/Contact Name	Mailing Address	City/State/Zip
PEDERSON JANE	4177 S WASHINGTON	ENGLEWOOD, CO 80110

[-] Location Information

Approved Well Location:

Q40	Q160	Section	Township	Range	PM	Footage from	Section Lines
SE	NW	29	12.0S	71.0W	Sixth	1900 N	2600 W

Northing (UTM y): 4314679.5 **Easting (UTM x):** 469318.9
Location Accuracy: Spotted from section lines

Subdivision Name

LAKE GEORGE PARK

Filing Block Lot
 65

Parcel ID:

Acres in Tract: 0.25

[-] Permit Details

Date Issued: 07/06/1978 **Date Expires:** 07/06/1980

Uses (See [Imaged Documents](#) for more information)

General Use(s): HOUSEHOLD USE ONLY

Aquifer(s): ALL UNNAMED AQUIFERS

Special Use:

Area which may be irrigated:

Annual volume of appropriation: 1

Statute:

Cross Reference Permit(s): **Permit Number** **Receipt**

Comments:

[-] Construction/Usage Details

Well Construction Date: 05/23/1978 **Pump Installation Date:** 07/20/1978

Well Plugged: **1st Beneficial Use:**

Elevation	Depth	Perforated Casing (Top)	Perforated Casing (Bottom)	Static Water Level	Pump Rate
95	35	95	28	4	

	Lic #	Name	Address	Phone Number
Driller	676	MOSS, DAN	BOX D DIVIDE, CO 80814	303-687-3503
Pump Installer	823	DEMING, MERL	BOX 935 WOODLAND PARK, CO 80863	719-687-9832

[-] Application/Permit History

Pump Installation Report Received	08/09/1978
Pump Installed	07/20/1978
Well Construction Report Received	07/13/1978
Permit Issued	07/06/1978
Well Constructed	05/23/1978
Application Received	05/12/1978

Disclaimer

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This page should not be used as a basis for any legal consideration, to determine the allowed uses of the well, to determine construction information, or to determine the terms and conditions under which the well can operate. The complete well permit file should be viewed to obtain details on the allowed uses and other relevant information. A complete copy of this file is available in the "Imaged Documents" section of this page, and can be viewed by opening all of the documents listed under that section (documents will open as pdf files).

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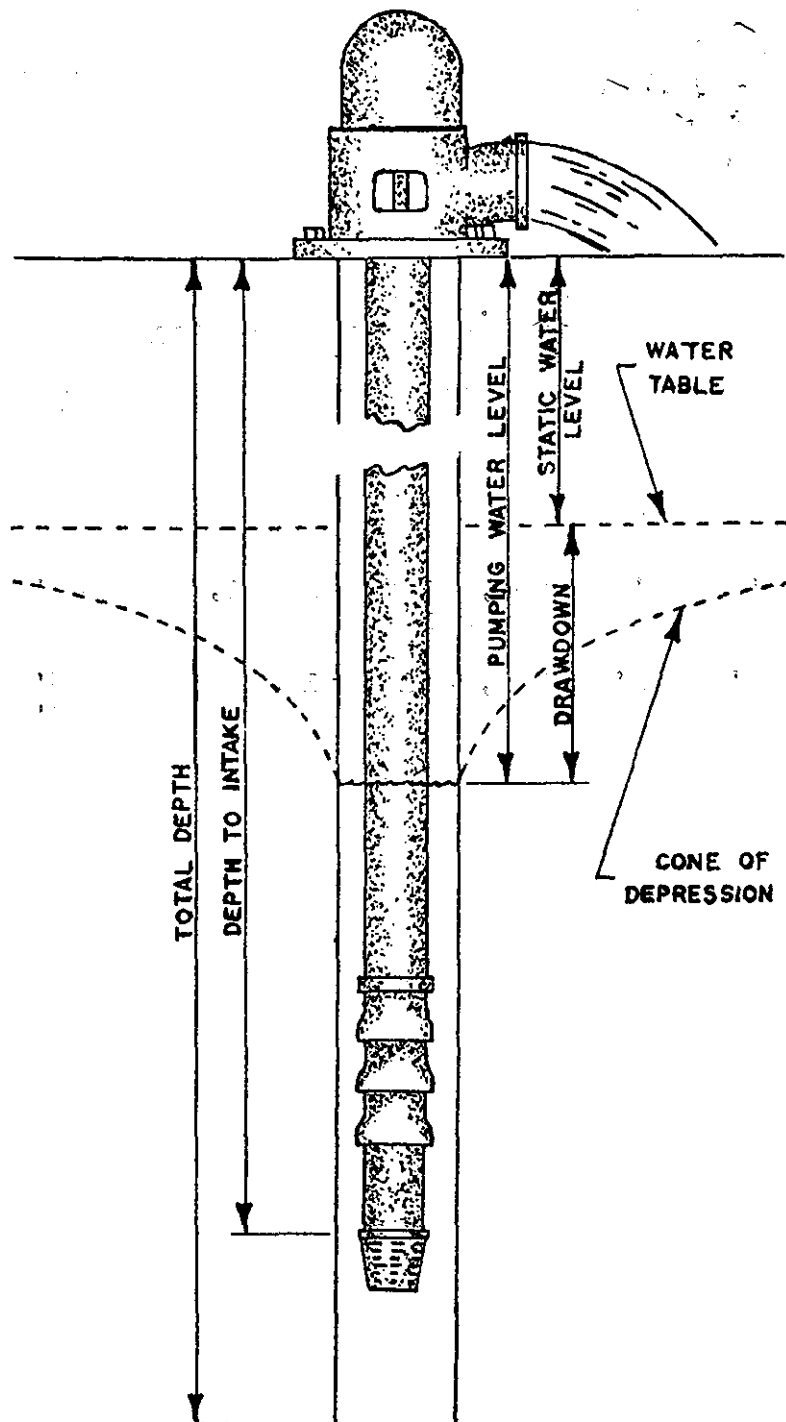
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PUMP INSTALLATION REPORT

Pump Make _____
Type _____
Powered by _____ HP _____
Pump Serial No. _____
Motor Serial No. _____
Date Installed _____
Pump Intake Depth _____
Remarks _____

WELL TEST DATA WITH PERMANENT PUMP

Date Tested _____
Static Water Level Prior to Test _____
Length of Test _____ Hours
Sustained yield (Metered) _____ GPM
Pumping Water Level _____
Remarks _____



CONTRACTORS STATEMENT

The undersigned, being duly sworn upon oath, deposes and says that he is the contractor of the well or pump installation described hereon; that he has read the statement made hereon; knows the content thereof, and that the same is true of his own knowledge.

Signature _____ License No. 1676
State of Colorado, County of Weller SS
Subscribed and sworn to before me this 25 day of July, 19 78.
My Commission expires: My Commission Expires June 25, 1982, 19 ____.
Notary Public Steve Mass

FORM TO BE MADE OUT IN QUADRUPLICATE: WHITE FORM must be an original copy on both sides and signed. WHITE AND GREEN copies must be filed with the State Engineer. PINK COPY is for the Owner and YELLOW COPY is for the Driller.

COLORADO DIVISION OF WATER RESOURCES

THIS FORM MUST BE SUBMITTED
WITHIN 60 DAYS OF COMPLETION
OF THE WORK DESCRIBED HERE-
ON. TYPE OR PRINT IN BLACK
INK.

1313 Sherman Street - Room 818
Denver, Colorado 80203

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 100039

RECEIVED

AUG - 9 '78

WATER RESOURCES
STATE ENGINEER
COLD

WELL OWNER CHARLES L. OR M. JANE PEDERSEN SE ¼ of the NW ¼ of Sec. 29

ADDRESS 4177 S. WASHINGTON ENGLEWOOD, COLO T. 12 S. R. 71 18' 6 P.M.

DATE COMPLETED _____, 19__ HOLE DIAMETER _____

WELL LOG

From	To	Type and Color of Material	Water Loc.

TOTAL DEPTH _____

Use additional pages necessary to complete log.

_____ in. from _____ to _____ ft.

_____ in. from _____ to _____ ft.

_____ in. from _____ to _____ ft.

DRILLING METHOD

CASING RECORD: Plain Casing

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

Perforated Casing

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

GROUTING RECORD

Material _____

Intervals _____

Placement Method _____

GRAVEL PACK: Size

Interval _____

TEST DATA

Date Tested _____, 19____

Static Water Level Prior to Test _____ ft.

Type of Test Pump _____

Length of Test _____

Sustained Yield (Metered) _____

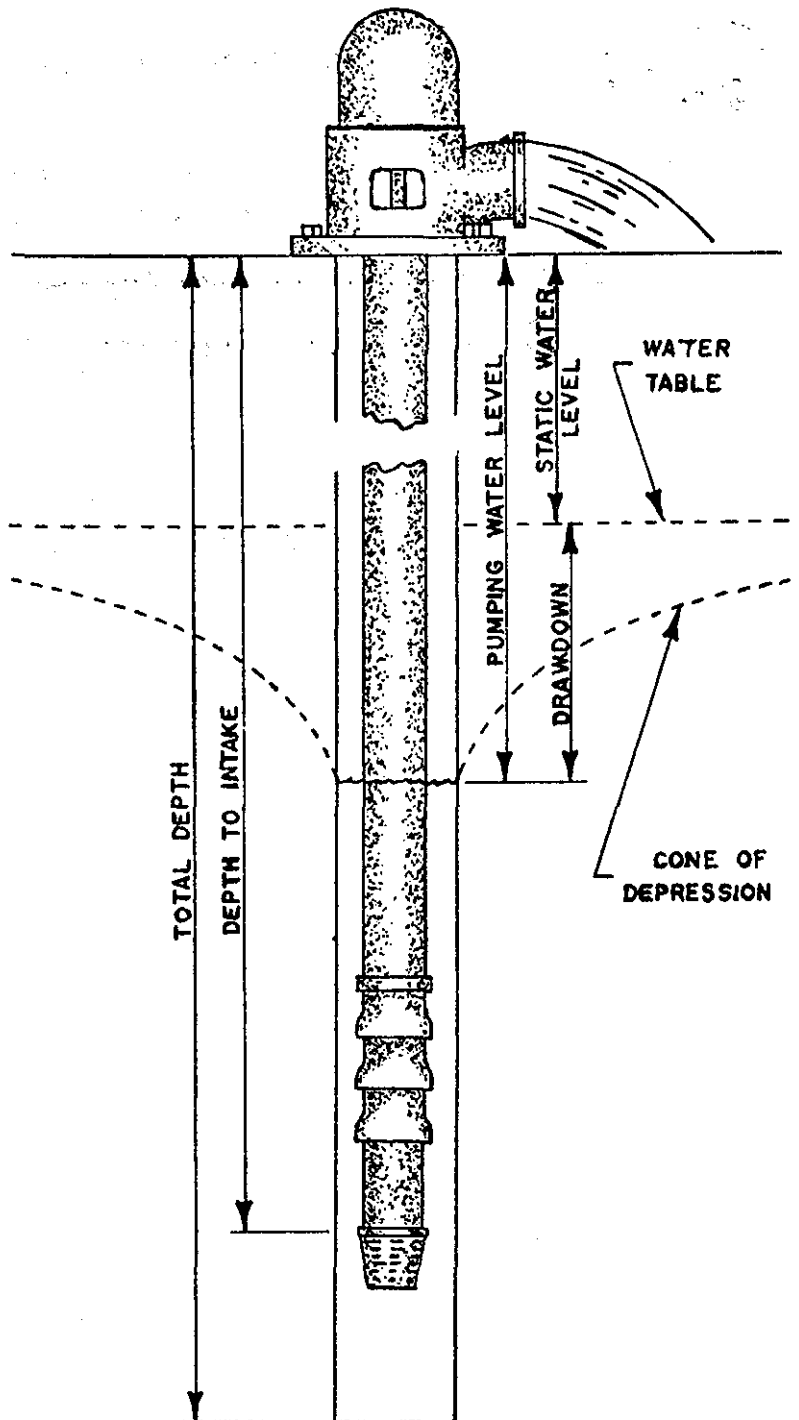
Final Pumping Water Level 10.0

PUMP INSTALLATION REPORT

Pump Make GOULDS
Type SUBMERSIBLE
Powered by 115 VOLT HP 1/3
Pump Serial No. 7EH
Motor Serial No. B76
Date Installed 7/20/78
Pump Intake Depth 90
Remarks _____

WELL TEST DATA WITH PERMANENT PUMP

Date Tested 7/20/78
Static Water Level Prior to Test 22
Length of Test 2 Hours
Sustained yield (Metered) 4 GPM
Pumping Water Level 90
Remarks _____



CONTRACTORS STATEMENT

The undersigned, being duly sworn upon oath, deposes and says that he is the contractor of the well or pump installation described hereon; that he has read the statement made hereon; knows the content thereof, and that the same is true of his own knowledge.

Signature Muel Deming License No. 823

State of Colorado, County of Jeller SS

Subscribed and sworn to before me this 8th day of August, 1978.

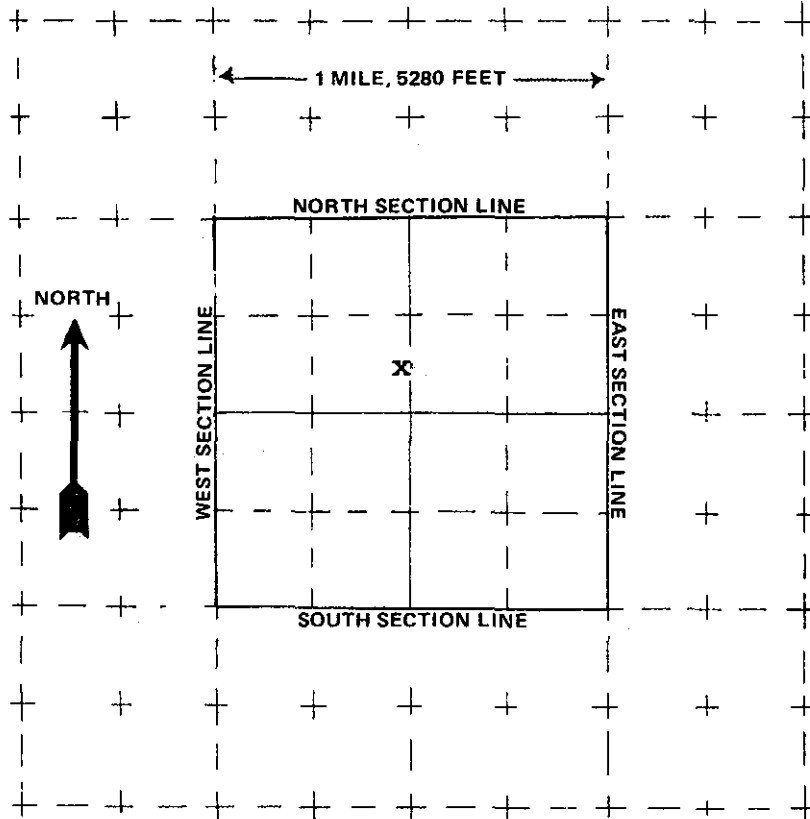
My Commission expires: My Commission Expires Aug. 8, 1980, 19 .

Notary Public Jacqueline Deming

FORM TO BE MADE OUT IN QUADRUPLICATE: WHITE FORM must be an original copy on both sides and signed. WHITE AND GREEN copies must be filed with the State Engineer. PINK COPY is for the Owner and YELLOW COPY is for the Driller.

I.D. 1-110 COUNTY 222

(5) **THE LOCATION OF THE PROPOSED WELL** and the area on which the water will be used must be indicated on the diagram below. Use the CENTER SECTION (1 section, 640 acres) for the well location.



The scale of the diagram is 2 inches = 1 mile
Each small square represents 40 acres.

WATER EQUIVALENTS TABLE (Rounded Figures)

An acre-foot covers 1 acre of land 1 foot deep
1 cubic foot per second (cfs) . . . 449 gallons per minute (gpm)
A family of 5 will require approximately 1 acre-foot of water per year.
1 acre-foot . . . 43,560 cubic feet . . . 325,900 gallons.
1,000 gpm pumped continuously for one day produces 4.42 acre-feet.

(6) **THE WELL MUST BE LOCATED BELOW** by distances from section lines.

1900 ft. from North (north or south) sec. line

2600 ft. from West (east or west) sec. line

LOT 65 BLOCK _____ FILING # _____

SUBDIVISION Lake George

(7) **TRACT ON WHICH WELL WILL BE LOCATED** Owner: Jane Pederson

No. of acres: 1/4 Will this be the only well on this tract? Yes

(8) **PROPOSED CASING PROGRAM**

Plain Casing

6 5/8 in. from 0' ft. to 20' ft.

_____ in. from _____ ft. to _____ ft.

Perforated casing

4 in. from 10 ft. to 150 ft.

_____ in. from _____ ft. to _____ ft.

(9) **FOR REPLACEMENT WELLS** give distance and direction from old well and plans for plugging it:

(10) **LAND ON WHICH GROUND WATER WILL BE USED:**

Owner(s): Jane Pederson No. of acres: 1/4

Legal description: SE 1/4 of the NW 1/4, Sec. 29, Twp. 12S, Rng. 71W, Park County, Co.

(11) **DETAILED DESCRIPTION** of the use of ground water: Household use and domestic wells must indicate type of disposal system to be used.

Household use only. County approved leaching field and septic tank.

(12) **OTHER WATER RIGHTS** used on this land, including wells. Give Registration and Water Court Case Numbers.

Type or right

Used for (purpose)

Description of land on which used

None.

(13) **THE APPLICANT(S) STATE(S) THAT THE INFORMATION SET FORTH HEREON IS TRUE TO THE BEST OF HIS KNOWLEDGE.**

Jane Pederson

SIGNATURE OF APPLICANT(S)

Colorado Division of Water Resources

Colorado's Well Permit Search

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Well Constructed

[Help](#)

Last Refresh: 2/1/2016 12:01:24 AM

Receipt: 0382714B **Division:** 1
Permit #: 187283- - **Water District:** 23
Well Name / #: **County:** PARK
Designated Basin: **Management District:**
Case Number: W2542
WDID:

[-] Imaged Documents - Permit File

Document Name	Date Imaged	Annotated
Change in Owner Name/Address/Location	08/24/2012	No
Correspondence, Memos, Findings & Hearings	08/23/2012	No
Permit to Construct a Well	08/23/2012	Yes
Correspondence, Memos, Findings & Hearings	07/26/2012	No
Correspondence, Memos, Findings & Hearings	07/26/2012	No
Original File	12/06/2007	No

[-] Applicant/Contact

Applicant/Contact Name	Mailing Address	City/State/Zip
DAVIES RICHARD & TERESA	767 PINON RIDGE DRIVE	WOODLAND PARK, CO 80863-

[-] Location Information

Approved Well Location:

Q40	Q160	Section	Township	Range	PM	Footage from Section Lines
SE	NW	29	12.0S	71.0W	Sixth	1420 N 1520 W

Northing (UTM y): 4314814.2 **Easting (UTM x):** 468988.6

Location Accuracy: Spotted from section lines

Subdivision Name

LAKE GEORGE PARK

Filing Block Lot

11

Parcel ID:

Acres in Tract:

[-] Permit Details

Date Issued: 05/30/1995 **Date Expires:** 05/30/1997

Uses (See [Imaged Documents](#) for more information)

General Use(s): COMMERCIAL

Aquifer(s): ALL UNNAMED AQUIFERS

Special Use:

Area which may be irrigated:

Annual volume of appropriation:

Statute:

Cross Reference Permit(s): **Permit Number** **Receipt**

Comments:

[-] Construction/Usage Details

Well Construction Date: 10/11/1995 **Pump Installation Date:** 11/20/1996

Well Plugged: **1st Beneficial Use:**

Elevation	Depth	Perforated Casing (Top)	Perforated Casing (Bottom)	Static Water Level	Pump Rate
150	30	130	23	4.5	

	Lic #	Name	Address	Phone Number
Driller	1155	DIETRICH, WILLIAM F.	BOX 287 FLORISSANT, CO 80816	719-748-3318
Pump Installer	1155	DIETRICH, WILLIAM F.	BOX 287 FLORISSANT, CO 80816	719-748-3318

[-] Application/Permit History

Ownership Change	08/16/2012
Pump Installation Report Received	11/22/1996
Pump Installed	11/20/1996
Well Construction Report Received	10/13/1995
Well Constructed	10/11/1995

Permit Issued	05/30/1995
Application Received	03/20/1995

Disclaimer

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RECEIVED

NOV 22 1996

WATER RESOURCES
STATE ENGINEER
GWS-32-93003

1. WELL PERMIT NUMBER: 187283

2. OWNER NAME(S) : Wildhorn Realty & Development Inc.
Mailing Address: Box 220
City, St. Zip : Lake George, CO. 80827
Phone : (719) 748-8675

3. WELL LOCATION AS DRILLED: SE 1/4 NW 1/4, Sec: 29 Twp: 12 S Range: 71 W
DISTANCES FROM SEC. LINES
1420 ft. from North Sec. line and 1520 ft. from West Sec. line.
SUBDIVISION: Lake George Park LOT: 11 BLOCK: FILING:
STREET ADDRESS AT WELL LOCATION:

4. PUMP DATA: Type-Submersible Installation Completed 11/20/96
Pump Manufacturer: STA-RITE Pump Model No.: 8P4B02P-02
Design GPM: 8 at RPM: 3450, HP: 1/3, Volts: 230, Full Load Amps: 4
Pump Intake Depth 131 Feet, Drop/Column Pipe Size: 1" Inches, Kind SCH80
ADDITIONAL INFORMATION FOR PUMPS GREATER THAN 50 GPM:
TURBINE DRIVER TYPE: ☐ Electric ☐ Engine ☐ Other
Design Head feet, Number of Stages, Shaft Size in.

5. OTHER EQUIPMENT:
Airline Installed ☐ Yes ☒ No, Orifice Depth ft.
Monitor Tube Installed ☐ Yes ☒ No Depth ft.
Flow Meter Mfg.: Meter Serial No.:
Meter Readout ☐ Gallons ☐ Thousand Gallons ☐ Acre Feet, Beginning Reading

6. TEST DATA: ☐ Check box if Test data is submitted on Supplemental Form
Date: 11/20/96 / /
Total Well Depth: 150 Feet Time: 11:30AM : :
Static Level: 23' Feet Rate (GPM): 4.5
Date Measured: 11/20/96 Pumping Lvl.: 131'

7. DISINFECTION: Type - HTH Granules Amt. Used - 6 oz.

8. Water Quality analysis available. ☐ Yes ☒ No

9. Remarks: Owner supplied his own pump 96221LP

10. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104(13)(a) C.R.S. the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR: RMPD, LTD. Phone: (719) 748-3318 Lic. No. 1155
Mailing Address: P.O. Box 287, Florissant, Co. 80816

Nm/Ttl: William F. Dietrich Pres Signature *William F. Dietrich* Date 11/20/96

RECEIVED

OCT 13 1995

OVER 81-93-02
STATE ENGINEER
COLO

1. WELL PERMIT NUMBER: 187283

2. OWNER NAME(S) : Wildhorn Realty & Development Inc.
Mailing Address: Box 220
City, St. Zip : Lake George, CO. 80827
Phone : (719) 748-8675

3. WELL LOCATION AS DRILLED: SE 1/4 NW 1/4, Sec: 29 Twp: 12 S ,Range:71 W
DISTANCES FROM SEC. LINES:
1420 ft. from North Sec.line. and 1520 ft. from West Sec.line. OR
SUBDIVISION: Lake George Park LOT: 11 BLOCK: FILING:
STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION: ft. DRILLING METHOD: Air Percussion
DATE COMPLETED: 10/11/95 TOTAL DEPTH: 150 ft. DEPTH COMPLETED: 150 ft.

5. GEOLOGIC LOG:
Depth Description of Material
0 - 23 Pink & Black Granite
23 - 65 Shale
65 - 70 Fractured WATER 65'
70 - 150 Shale (Black)

6. HOLE DIAM. (in.) From(ft) To(ft)
8 1/2 0 20
6 1/8 20 150

7. PLAIN CASING
OD(in) Kind Wall Size From(ft) To(ft)
6 5/8 Steel 188 +1 20
4.5 PVC 227 15 30
4.5 PVC 227 130 150

Perf. Casing: Screen Slot Size:.30
4.5 PVC 227 30 130

8. FILTER PACK:
Material:N/A
Size:
Interval:

9. PACKER PLACEMENT
Type N/A
Depth

REMARKS:

10. GROUTING RECORD:
Material Amount Density Interval Placeme
Cement 188 lbs. 6/pk 0-20 Poured

11. DISINFECTION: Type - HTH Granules Amt. Used - 12oz.

12. WELL TEST DATA ☐ Check box if Test Data submitted on Supplemental Form
TESTING METHOD: Air
Static Level: 22' ft. Date/Time:10/11/95 10:30AM Prod. Rate: 4.5 gpm
Pumping level:0 ft. Date/Time:10/11/95 2:30PM Test Length(hrs): 2
Remarks 95046LD

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge.[Pursuant to Section 24-4-104(13)(a) C.R.S. the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR: RMPD, LTD. Phone: (719) 748-3318 Lic. No.: 1155
Mailing Address: P.O. Box 287, Florissant, Co. 80816

Nam/Ttl: William F. Dietrich Pres Signature *William F. Dietrich* Date 10/12/95

OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES

818 Centennial Bldg., 1313 Sherman St., Denver, Colorado 80203
(303) 866-3581

1155

APPLICANT

WELL PERMIT NUMBER **187283**
DIV. 1 CNTY. 47 WD 23 DES. BASIN MD

Lot: 11 Block: Filing: Subdiv: LAKE GEORGE PARK

APPROVED WELL LOCATION
PARK COUNTY

SE 1/4 NW 1/4 Section 29
Twp 12 S RANGE 71 W 6th P.M.

DISTANCES FROM SECTION LINES

1420 Ft. from North Section Line
1520 Ft. from West Section Line

WILD HORN REALTY & DEVELOPMENT INC
BOX 220
LAKE GEORGE CO 80827-

(719)748-8675

PERMIT TO CONSTRUCT A WELL

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT
CONDITIONS OF APPROVAL

- 1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of the permit does not assure the applicant that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.
- 2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.
- 3) Approved pursuant to CRS 37-92-602(3)(b)(I) and the policy of the State Engineer for appropriation of ground water tributary to South Platte River system.
- 4) The use of ground water from this well is limited to drinking and sanitary facilities as described in CRS 37-92-602(1)(c), for a commercial business, indicated as a realty office. Water from this well shall not be used for lawn or landscape irrigation or for any other purpose outside the business building structure.
- 5) The maximum pumping rate shall not exceed 15 GPM.
- 6) The maximum annual amount of ground water to be diverted by this well shall not exceed 1/3 acre-foot (108,600 gallons).
- 7) Approved as the only well on a site of 0.17 acres described as Lot 11, Lake George Park Subdivision, Park County.
- 8) The return flow from the use of the well must be through an individual waste water disposal system of the non-evaporative type where the water is returned to the same stream system in which the well is located.
- 9) A totalizing flow meter must be installed on this well and maintained in good working order. Permanent records of all diversions must be maintained by the well owner (recorded at least annually) and submitted to the Division Engineer upon request.
- 10) This well shall be constructed not more than 200 feet from the location specified on this permit.

5/26/95
MAS

APPROVED
MAS

State Engineer

Receipt No. 0382714B

DATE ISSUED MAY 30 1995

By

WCM [Signature] 5/26/95
EXPIRATION DATE MAY 30 1997

RECEIVED

MAY 17 '95

WATER RESOURCES
STATE ENGINEER
COLO

PERMIT APPLICATION FORM

Application must be complete where applicable. Type or print in BLACK INK. No overstrikes or erasures unless initialed.

(X) A PERMIT TO USE GROUND WATER MAR 20 '95
(X) A PERMIT TO CONSTRUCT A WELL
FOR: (X) A PERMIT TO INSTALL A PUMP WATER RES. USE

() REPLACEMENT FOR NO. 660
() OTHER _____

WATER COURT CASE NO. W-2542

(1) APPLICANT - mailing address

NAME WILD HORN REALTY & DEVELOPMENT
STREET PO Box 220
CITY LAKE GEORGE, CO- 80827
(State) (Zip)
TELEPHONE NO. 719-748-8695

(2) LOCATION OF PROPOSED WELL

County PARK
SE % of the NW %, Section 29
 Twp. 12 S, Rng. 71 W, 6th P.M.
 (N.S) (E.W)

(3) WATER USE AND WELL DATA

Proposed maximum pumping rate (gpm) 15

Average annual amount of ground water to be appropriated (acre-feet): 1/3

Number of acres to be irrigated: 0

Proposed total depth (feet): 100

Aquifer ground water is to be obtained from:
Fractured Granite

Owner's well designation _____

GROUND WATER TO BE USED FOR:

() HOUSEHOLD USE ONLY - no irrigation (0)
 () DOMESTIC (1) () INDUSTRIAL (5)
 () LIVESTOCK (2) () IRRIGATION (6)
 (X) COMMERCIAL (4) () MUNICIPAL (8)
 () OTHER (9) _____

DETAIL THE USE ON BACK IN (11)

(4) DRILLER

Name RMPD, LTD.
Street P.O. Box 287
City Florissant, Co. 80816
(State) (Zip)
Telephone No. 748-3318 Lic. No. 1155

FOR OFFICE-USE ONLY: DO NOT WRITE IN THIS COLUMN

Receipt No. 382714-B / MAS
Basin _____ Dist. _____

plot - no plot **CONDITIONS OF APPROVAL** p. 72 ✓

This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of the permit does not assure the applicant that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

Look nothing else
Just Lot

tab - 11 wells

W-2542 - municipal - spoke w/

driller - no water service to this lot - see ltr from applicant

Per EPF - 1 worker in an office -

15 gal/day

200 gal \approx 13 workers

Per Denise P - no water lines
in Lake Geo Park to her
knowledge.

APPLICATION APPROVED

Best Copy Available

PERMIT NUMBER _____

DATE ISSUED _____

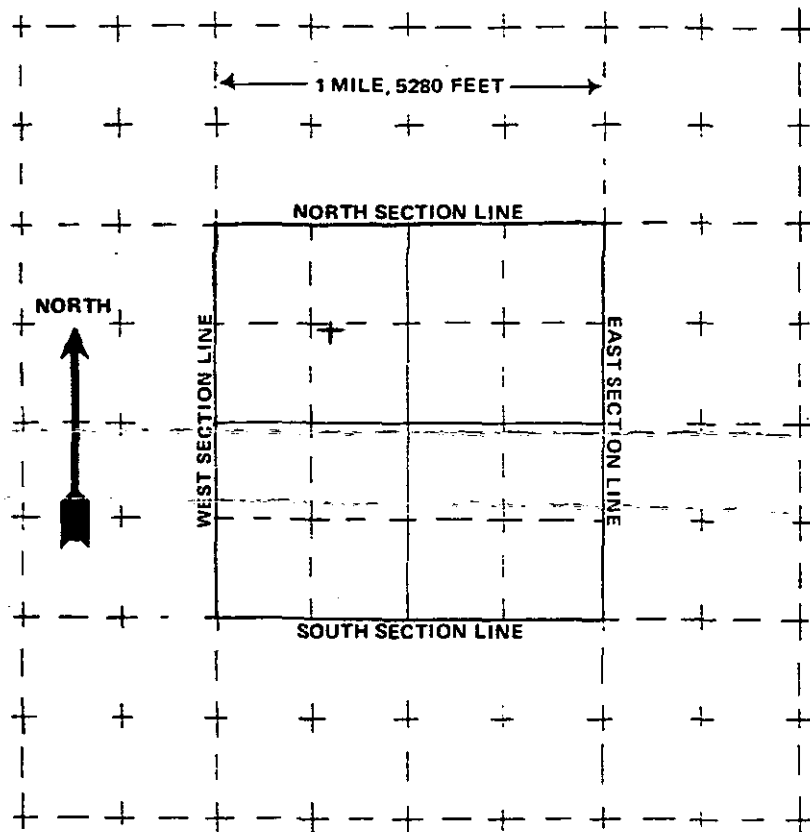
EXPIRATION DATE _____

CHECKS TRH382724 032095 80.00
 DIV OF WATER RESOURCES
 (STATE ENGINEER)

BY _____

I.D. 1 COUNTY 47 23

(5) **THE LOCATION OF THE PROPOSED WELL** and the area on which the water will be used must be indicated on the diagram below. Use the **CENTER SECTION** (1 section, 640 acres) for the well location.



The scale of the diagram is 2 inches = 1 mile
Each small square represents 40 acres.

WATER EQUIVALENTS TABLE (Rounded Figures)

An acre-foot covers 1 acre of land 1 foot deep
1 cubic foot per second (cfs) . . . 449 gallons per minute (gpm)
A family of 5 will require approximately 1 acre-foot of water per year.
1 acre-foot . . . 43,560 cubic feet . . . 325,900 gallons.
1,000 gpm pumped continuously for one day produces 4.42 acre-feet.

(6) **THE WELL MUST BE LOCATED BELOW** by distances from section lines.

1420 ft. from North sec. line
(north or south)
1520 ft. from West sec. line
(east or west)

LOT 11 BLOCK _____ FILING # _____

SUBDIVISION Lake George Park

(7) **TRACT ON WHICH WELL WILL BE LOCATED** Owner: applicant

No. of acres 0.17 Will this be the only well on this tract? yes

(8) **PROPOSED "CASING" PROGRAM**

Plain Casing

6 5/8 in. from +1 ft. to 20 ft.

4 in. from 10 ft. to 80 ft.

Perforated casing

4 in. from 80 ft. to 100 ft.

_____ in. from _____ ft. to _____ ft.

(9) **FOR REPLACEMENT WELLS** give distance and direction from old well and plans for plugging it:

N/A

(10) **LAND ON WHICH GROUND WATER WILL BE USED:**

Owner(s): Wildhorn Realty & Development, Inc. No. of acres: 0.17

Legal description: Park Co., SE 1/4 of the NW 1/4, Sect. 29, Twp. 12 S., Rng. 71 W., 64 P.M.

(11) **DETAILED DESCRIPTION** of the use of ground water: Household use and domestic wells must indicate type of disposal system to be used.

Commercial Use. County Approved Septic Tank & Leach Field.

(12) **OTHER WATER RIGHTS** used on this land, including wells. Give Registration and Water Court Case Numbers.

Type or right

Used for (purpose)

Description of land on which used

(13) **THE APPLICANT(S) STATE(S) THAT THE INFORMATION SET FORTH HEREON IS TRUE TO THE BEST OF HIS KNOWLEDGE.**

John P. Smith President
SIGNATURE OF APPLICANT(S)

RMPD, LTD.
DBA
ROCKY MOUNTAIN
PUMP & DRILLING

WATER WELLS, PUMPS, SEPTIC SYSTEMS
LIC. # 1155

POST OFFICE BOX 287
FLORISSANT, COLORADO 80816

(719) 687-6379, (719) 748-3318

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MAY 17 '95

WATER RESOURCES
STATE ENGINEER
COLO

May 11, 1995

Office Of The State Engineer
Division of Water Resources
1313 Sherman Street, Room 818
Denver, CO. 80203

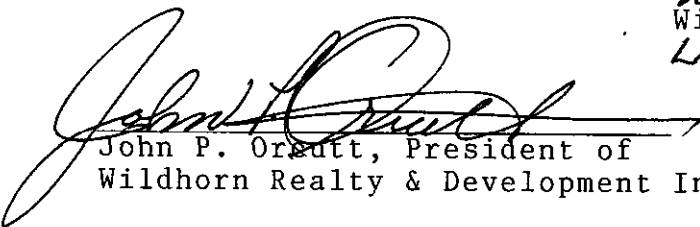
Attention: Megan Sullivan
RE: Wildhorn Realty & Development Inc.

1. Total Maximum Annual Withdrawal from my well, on Lot 11 in Lake George Park will be: 200 Gallons Per Day, will use 300 days out of the year, totaling 60,000 Gallons Per Year.
2. The only source of water supply available for this property is by the construction of a well, for which I am applying for Receipt No. 382714-B.

If you have any questions, please feel free to contact me.

Thank You,

William F. Dietrich
William F. Dietrich
Lic # 1155


John P. Orsutt, President of
Wildhorn Realty & Development Inc.

STATE OF COLORADO

OFFICE OF THE STATE ENGINEER

Division of Water Resources
Department of Natural Resources
1313 Sherman Street, Room 818
Denver, Colorado 80203
Phone (303) 866-3581
FAX (303) 866-3589



Roy Romer
Governor
James S. Lochhead
Executive Director
Hal D. Simpson
State Engineer

May 4, 1995

RECEIVED

MAY 17 '95

WATER RESOURCES
STATE ENGINEER
COLO

WILDHORN REALTY & DEVELOPMENT CORP
PO BOX 220
LAKE GEORGE CO 80827

RE: Receipt #382714-B

Dear Applicant;

I am returning the enclosed application to construct a new well to you for clarification and correction.

First, because commercial use is indicated for this well, detailed information will need to be submitted as an attachment to your application. This information should quantify the total annual withdrawal from (all) well(s) providing water to this property. i.e. - calculations made by you, or your consultant, that document the total maximum annual withdrawal from the well in gallons or acre feet* (gallons per day, multiplied by number of days of use).

If the use of your well qualifies as *exempt* commercial pursuant to the Policy of the State Engineer, then **item (3)** should indicate that the **maximum annual withdrawal does not exceed one third* (1/3) of an acre foot**.

Second, research through our tabulation of water rights revealed a decree, Division 1 Water Court case no. W-2542 (copy enclosed), for two municipal type wells, for serving lots 1 through 75 of the Lake George Park subdivision. One of the requirements for a commercial exempt well is that no other water supply source or system is available to serve the property. An affidavit by the applicant affirming this situation must accompany the applications as well as an affidavit from any entity capable of serving the use that it will not do so.

Once the application is resubmitted to this office, it will be processed in the order it was first received. When resubmitting your application and enclosures, please review this letter and use it as a check list to insure that all items discussed have been adequately addressed, corrected and/or clarified. If you have any other questions, please contact this office at 303/866-3587. When making inquiries, reference this letter and the above receipt number. Thank you for your understanding and cooperation.

Sincerely,

Megan Sullivan

Megan Sullivan
Water Supply Branch, North Region

enclosure(s)

* one acre foot equals 325,900 gallons

days in
year

est. gallons per day
mut by # of days of use

200 gallons
per day

Land • Homes • Cabins • Ranches • Commercial • Investment

John P. Orcutt
Real Estate Broker

WILDHORN REALTY, INC.

P.O. Box 220 • Lake George, CO 80827
Bus. (719) 748-8675

Uvonne K. Orcutt
Broker Assoc.

Terri L. Teague
Sales Associate



RECEIVED

MAR 20 '95

WATER RESOURCES
STATEMENT
CDD.

TO WHOM IT MAY CONCERN;

March 16, 1995

The water use for this permit will be a bathroom in a real estate office and drinking water.

Wildhorn Realty, Inc.


John P. Orcutt-President

REC # 382714B

Mountain Property Specialists • Honest Dependable Service

REC # 302714B

ID: -----

MAY 25 '95

14:52 No.003 P.01

400 Front Street
P. O. Box 807
(719) 836-2622 FAX (719) 836-3279
Fairplay, Colorado 80440

RECEIVED

MAY 25 1995

WATER RESOURCES
STATE ENGINEER
COLO.

FAX TRANSMITTAL

FAX NO.

303 866-3589

DATE:

MAY 25, 1995

TO:

Megan Sullivan

FROM:

Denise Paprocki

RE:

Well plotted in case W-2542

Number of pages (total, including this sheet) 1

If you do not receive all pages please contact Denise

at (719) 836-2622, 2557

Thank you.

LAKE GEORGE PARK

LOT 4 (Ass'd w/ Lot 3)

Monte & Judy Hartwell
Box 368

Lake George, Co. 80827

Well #1

Lot 63

David & Nancy Brake
1516 Laurence Ct.

Wichita, Ks. 67206

Well #2

Best Copy Available

Colorado Division of Water Resources

Colorado's Well Permit Search

THIS PAGE IS NOT THE ACTUAL PERMIT

The information contained on this page is a summary of the permit file and may not reflect all details of the well permit. ([Full Disclaimer](#))

Well Constructed

[Help](#)

Last Refresh: 2/1/2016 12:01:24 AM

Receipt: 0411190 **Division:** 1
Permit #: 200953- - **Water District:** 23
Well Name / #: **County:** PARK
Designated Basin: **Management District:**
Case Number:
WDID:

[-] Imaged Documents - Permit File

Document Name	Date Imaged	Annotated
Original File	12/07/2007	No

[-] Applicant/Contact

Applicant/Contact Name	Mailing Address	City/State/Zip
BRUVOLD GINGER R	PO BOX 86	LAKE GEORGE, CO 80827

[-] Location Information

Approved Well Location:

Q40	Q160	Section	Township	Range	PM	Footage from Section Lines
SE	NW	29	12.0S	71.0W	Sixth	1770 N 2540 W

Northing (UTM y): 4314718.7 **Easting (UTM x):** 469300.3
Location Accuracy: Spotted from section lines

Subdivision Name

LAKE GEORGE PARK

Filing Block Lot
 66

Parcel ID: **Acres in Tract:** 0.39

[-] Permit Details

Date Issued: 02/11/1997 **Date Expires:** 02/11/1999

Uses (See [Imaged Documents](#) for more information)

General Use(s): HOUSEHOLD USE ONLY

Aquifer(s): ALL UNNAMED AQUIFERS

Special Use:

Area which may be irrigated:

Annual volume of appropriation:

Statute:

Cross Reference Permit(s): Permit Number Receipt

Comments:

[-] Construction/Usage Details

Well Construction Date: 02/28/1997

Pump Installation Date:

Well Plugged:

1st Beneficial Use:

Elevation	Depth	Perforated Casing (Top)	Perforated Casing (Bottom)	Static Water Level	Pump Rate
8150	125	25	105	33	12

Driller	Lic #	Name	Address	Phone Number
	1155	DIETRICH, WILLIAM F.	BOX 287 FLORISSANT, CO 80816	719-748-3318

[-] Application/Permit History

Well Construction Report Received	03/05/1997
Well Constructed	02/28/1997
Permit Issued	02/11/1997
Application Received	01/28/1997

Disclaimer

***The information contained on this page is a summary of the permit file and may not reflect all details of the well permit. THIS PAGE IS NOT THE ACTUAL PERMIT.**

This page should not be used as a basis for any legal consideration, to determine the allowed uses of the well, to determine construction information, or to determine the terms and conditions under which the well can operate. The complete well permit file should be viewed to obtain details on the allowed

uses and other relevant information. A complete copy of this file is available in the "Imaged Documents" section of this page, and can be viewed by opening all of the documents listed under that section (documents will open as pdf files).

Note that all of the terms and conditions under which a well can operate, particularly for non-exempt wells, may not be specified on the well permit. Wells may also be subject to relevant statutes, rules and decrees. To learn more about well permitting in Colorado, please visit [DWR's Well Permitting Page](#). If you have any questions about this well permit file, please contact the [DWR Ground Water Information Desk](#).

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FORM # GWS-31 11/90	WELL CONSTRUCTION AND TEST REPORT STATE OF COLORADO, OFFICE OF THE STATE ENGINEER 814 Centennial Bldg., 1313 Sherman St. Denver Co.		Office Use Only <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 150px;"> RECEIVED MAR 05 1997 GWS-31-55802 </div>	
1.	WELL PERMIT NUMBER: 200953			
2.	OWNER NAME(S) : Ginger R. Bruvold Mailing Address: Box 86 City, St. Zip : Lake George, CO. 80827 Phone : (719) 748-8619			
3.	WELL LOCATION AS DRILLED: SE 1/4 NW 1/4, Sec: 29 Twp: 12 S ,Range:71 W DISTANCES FROM SEC. LINES: 1770 ft. from North Sec.line. and 2540 ft. from West Sec.line. OR SUBDIVISION: Lake George Park LOT: 66 BLOCK: FILING: STREET ADDRESS AT WELL LOCATION:			
4.	GROUND SURFACE ELEVATION:8150 ft. DRILLING METHOD: Air Percussion DATE COMPLETED: 02/28/97 TOTAL DEPTH: 125 ft. DEPTH COMPLETED: 125 ft.			
5. GEOLOGIC LOG:		6. HOLE DIAM. (in.) From(ft) To(ft)		
Depth	Description of Material			
0 -	3 Topsoil	8 1/2	0	20
3 -	51 Grey Shale	6 1/8	20	125
51 -	53 Fractured WATER	7. PLAIN CASING		
53 -	95 Black Shale	OD(in)	Kind	Wall Size From(ft) To(ft)
95 -	97 Fractured WATER	6 5/8	Steel	188 +1 20
97 -	125 Black Shale	4.5	PVC	227 15 25
		4.5	PVC	227 105 125
REMARKS:		Perf. Casing: Screen Slot Size:.30		
		4.5 PVC 227 25 105		
		8. FILTER PACK: Material:N/A Size: Interval: 9. PACKER PLACEMENT Type N/A Depth		
REMARKS:		10. GROUTING RECORD:		
		Material Amount Density Interval Placeme Cement 188 lbs. 6/pk 0-20 Poured		
11.	DISINFECTION: Type - HTH Granules Amt. Used - 5 oz.			
12.	WELL TEST DATA <input type="checkbox"/> Check box if Test Data submitted on Supplemental Form TESTING METHOD: Air Static Level: 33' ft. Date/Time:02/28/97 1:00PM Prod. Rate: 12 gpm Pumping level:0 ft. Date/Time:02/28/97 3:00PM Test Length(hrs): 2 Remarks 97013LD			
13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge.[Pursuant to Section 24-4-104(13)(a) C.R.S. the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.] CONTRACTOR: RMPD, LTD. Phone: (719) 748-3318 Lic. No.: 1155 Mailing Address: P.O. Box 287, Florissant, Co. 80816				
Nam/Ttl: William F. Dietrich Pres		Signature <i>William F. Dietrich</i>		Date 03/03/97

OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES

818 Centennial Bldg., 1313 Sherman St., Denver, Colorado 80203
(303) 866-3581

1155

WELL PERMIT NUMBER **200953**

DIV. 1 CNTY. 47 WD. 23 DES. BASIN MD

APPLICANT

SUBDIV: LAKE GEORGE PARK
LOT: 66 BLK: FLG:

LOT SIZE: 0.39 ACRES

GINGER R BRUVOLD
BOX 86
LAKE GEORGE CO 80827

(719) 748-8619

APPROVED WELL LOCATION

PARK COUNTY

SE 1/4 NW 1/4 SECTION 29

TWP 12 S RANGE 71 W 6th P.M

DISTANCES FROM SECTION LINES

1770 Ft. from North Section Line

2540 Ft. from West Section Line

PERMIT TO CONSTRUCT A WELL

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT
CONDITIONS OF APPROVAL

- 1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of the permit does not assure the applicant that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.
- 2) The construction of this well shall be in compliance with the Water Well Construction and Pump Installation Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.
- 3) Approved pursuant to CRS 37-92-602(3)(b)(II)(A) as the only well on the residential site DESCRIBED ABOVE.
- 4) The use of ground water from this well is limited to ordinary household purposes inside a single family dwelling. The ground water shall not be used for irrigation or other purposes.
- 5) The maximum pumping rate shall not exceed 15 GPM.
- 6) The return flow from the use of this well must be through a non-evaporative waste water disposal system where the water is returned to the same stream system in which the well is located.
- 7) This well shall be constructed not more than 200 feet from the location specified on this permit.

M.M. 2-11-97

Hal D. Simpson
State Engineer

M.A. Malley
By

Receipt No. 0411190

DATE ISSUED FEB 11 1997

EXPIRATION DATE FEB 11 1999

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM. 818, DENVER CO 80203
phone - info: (303) 866-3587 main: (303) 866-3581

NEW HOUSEHOLD USE ONLY

Review instructions prior to completing form

Water Well Permit Application

Must be completed in black ink or typed

1. APPLICANT INFORMATION				6. USE OF WELL	
Name of applicant <u>GINGER R. BRUVOLO</u>				ORDINARY HOUSEHOLD PURPOSES INSIDE ONE SINGLE FAMILY DWELLING (NO OUTSIDE USE)	
Mailing Address <u>Box 86</u>					
City State Zip code <u>LAKE GEORGE CO 80827</u>					
Telephone Number (include area code) <u>719 748 8619</u>				7. WELL DATA	
2. TYPE OF APPLICATION				MAXIMUM PRODUCTION RATE OF THE WELL WILL NOT EXCEED 15 GPM	
CONSTRUCT A NEW HOUSEHOLD USE ONLY WELL ON LESS THAN 35 ACRES				8. TYPE OF RESIDENTIAL SEWAGE SYSTEM	
3. REFER TO (if applicable):				<input checked="" type="checkbox"/> Septic tank / absorption leach field	
Monitoring hole acknowledgment # MH- <u>N/A</u>				<input type="checkbox"/> Central system	
4. LOCATION OF WELL				District name: _____	
County Quarter/quarter Quarter <u>Park SE 1/4 NW 1/4</u>				<input type="checkbox"/> Vault	
Section Township N or S Range E or W Principal Meridian <u>29 12 71 6th P.M.</u>				Location sewage to be hauled to: _____	
Distance of well from section lines <u>1770</u> ft. from <input checked="" type="checkbox"/> N <input type="checkbox"/> S <u>2540</u> ft. from <input type="checkbox"/> E <input checked="" type="checkbox"/> W				<input type="checkbox"/> Other (attach copy of engineering design)	
Well location address, if different from applicant address (if applicable) <u>32 Navajo Avenue</u>				9. PROPOSED WELL DRILLER (optional)	
5. TRACT ON WHICH WELL WILL BE LOCATED				Name License number <u>RMPD, LTD. 1155</u>	
A. You must check one of the following - see instructions				10. SIGNATURE of applicant(s) or authorized agent	
<input checked="" type="checkbox"/> Subdivision: Name <u>Lake George Park</u>				The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 mis- demeanor pursuant to C.R.S. 24-4-104(13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.	
Lot # <u>66</u> Block # _____ Filing/Unit# _____				Must be original signature <u>Ginger R Bruvold</u>	
<input type="checkbox"/> County Exemption (copy of county approval & survey must be attached)				Title Date Office Use Only <u>✓</u> <u>1-24-97</u>	
Exempt. name/# _____ Tract # _____				DWR Map No. _____	
<input type="checkbox"/> Mining claim (attach copy of deed or survey)				CHECKS TRW411190 012897 60.00	
Claim name/# _____				DIV OF WATER RESOURCES DIV <u>1</u>	
<input type="checkbox"/> Other (attach legal description to application)				CO <u>47</u>	
B. STATE PARCEL				WD <u>23</u>	
ID# (optional): _____				BA _____	
C. # of acres in tract				MD _____	
<u>.39 acres</u>				USE _____	
D.					
THIS WILL BE THE ONLY WELL ON THIS TRACT					

RECEIVED

200953

JAN 28 1997

STATE ENGINEER

HOUSEHOLD USE ONLY - GENERAL INSTRUCTIONS

There are a variety of uses for ground water in Colorado. This form (GWS-49) is to be used when applying for a permit for a NEW well that would be USED FOR ORDINARY HOUSEHOLD USE IN ONE SINGLE-FAMILY DWELLING. This type of well CANNOT be used for outside uses such as the watering of domestic animals and the watering of home gardens and lawns.

This form should not be used in the following cases:

REPLACEMENT of an existing well - Use form GWS-44
If OUTSIDE use is proposed - Use form GWS-44

FEES The application must be submitted with the required \$60 non-refundable filing fee.
Checks should be payable to the COLORADO DIVISION OF WATER RESOURCES.

Applications are evaluated in chronological order. Please allow approximately six weeks for processing.

APPLICATIONS must be completed clearly, and legibly, in BLACK INK or typed. ALL ITEMS in the application must be completed. Incomplete applications may be returned to the applicant for more information. Do not change or alter this application in any way.

THE LOCATION of the well in item 4 must be correctly and accurately described. The county, quarter/quarter, section, township, range, principal meridian, and distance from section lines must be provided.

NOTE: Distances are not necessarily the same distances as the distances from (your) property lines.

For additional assistance in describing the location of your well review the publication entitled "How to Determine Well Locations" which was provided with your packet, or can be requested from any Colorado Division of Water Resource office.

A LEGAL DESCRIPTION of your lot or parcel of land is required in item 5. If your lot is not in a recorded subdivision, attach a copy of a deed or legal description that shows your tract was split from a larger tract prior to June 1, 1972.

An ORIGINAL signature must be on each application. The applicant's authorized agent may sign the application, if a letter signed by the applicant is submitted with the application authorizing them to act as agent for the purpose of obtaining a well permit.

IF YOU HAVE ANY QUESTIONS regarding any item on the application form, please call the Division of Water Resources Ground Water Information Desk (303-866-3587), or the nearest Division of Water Resources Field Office located in Greeley (970-352-8712), Pueblo (719-542-3368), Alamosa (719-589-6683), Montrose (970-249-6622), Glenwood Springs (970-945-5665), Steamboat Springs (970-879-0272), or Durango (970-247-1845).

DETAILED INSTRUCTIONS ARE AVAILABLE UPON REQUEST

Colorado Division of Water Resources

Colorado's Well Permit Search

THIS PAGE IS NOT THE ACTUAL PERMIT

The information contained on this page is a summary of the permit file and may not reflect all details of the well permit. ([Full Disclaimer](#))

Well Constructed

[Help](#)

Last Refresh: 2/1/2016 12:01:24 AM

Receipt: C470014 **Division:** 1
Permit #: 14-WCB- **Water District:** 23
Well Name / #: **County:** PARK
Designated Basin: **Management District:**
Case Number:
WDID:

[-] Imaged Documents - Permit File

Document Name	Date Imaged	Annotated
Original File	07/11/2006	No

[-] Applicant/Contact

Applicant/Contact Name	Mailing Address	City/State/Zip
HUNTER WAYNE	LAKE GEORGE CAFE HWY 24	LAKE GEORGE, CO

[-] Location Information

Approved Well Location:

Q40	Q160	Section	Township	Range	PM	Footage from Section Lines
SE	SE	29	12.0S	71.0W	Sixth	
Northing (UTM y):		4314440.0		Easting (UTM x):		469339.7
Location Accuracy:		Spotted from quarters				

Subdivision Name

Filing Block Lot

Parcel ID:

Acres in Tract:

[-] Permit Details

Date Issued: 01/31/1955 **Date Expires:**

Uses (See [Imaged Documents](#) for more information)

General Use(s): DOMESTIC

Aquifer(s): ALL UNNAMED AQUIFERS

Special Use:

Area which may be irrigated:

Annual volume of appropriation:

Statute:

Cross Reference Permit(s): **Permit Number** **Receipt**

Comments:

[-] Construction/Usage Details

Well Construction Date: 01/25/1955

Pump Installation Date:

Well Plugged:

1st Beneficial Use:

Elevation	Depth	Perforated Casing (Top)	Perforated Casing (Bottom)	Static Water Level	Pump Rate
61					50

Lic #	Name	Address	Phone Number
164	CLEMENTS, ALFRED J		

Driller

[-] Application/Permit History

Permit Issued	01/31/1955
Well Constructed	01/25/1955

Disclaimer

***The information contained on this page is a summary of the permit file and may not reflect all details of the well permit. THIS PAGE IS NOT THE ACTUAL PERMIT.**

This page should not be used as a basis for any legal consideration, to determine the allowed uses of the well, to determine construction information, or to determine the terms and conditions under which the well can operate. The complete well permit file should be viewed to obtain details on the allowed uses and other relevant information. A complete copy of this file is available in the "Imaged Documents" section of this page, and can be viewed by opening all of the documents listed under that section (documents will open as pdf files).

Note that all of the terms and conditions under which a well can operate, particularly for non-exempt wells, may not be specified on the well permit. Wells may also be subject to relevant statutes, rules and decrees. To learn more about well permitting in Colorado, please visit [DWR's Well Permitting Page](#). If you have any questions about this well permit file, please contact the [DWR Ground Water Information Desk](#).

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COLORADO WATER CONSERVATION BOARD
LOG AND HISTORY

14

Location: Sec. 29 T. 12 R. 71 P.M. 1/4 Sec. 29 County Jefferson

or Street Address on Hwy #24 Lake George Cafe City Lake George Colo

Owned by Wayne Hunter Address Lake George Colo

Tenant _____ Address _____

Drilled by Alfred J. Chas. Co. Address 720 N. St. Salida Colo

Water Well Driller's License No. 114 Name or No. of Well Hunter well

Type of Well: Domestic ☒, Municipal ☐, Stock ☐, Irrigation ☐,

Industrial ☐, Drainage ☐, Other _____

Cased: 12 p ft. to 50' 8" ft. Type steel Size 7" 6 p Wt. of Casing: Lbs./Ft. 54

Cased: _____ ft. to _____ ft. Type _____ Size _____ Wt. of Casing: Lbs./Ft. _____

Cased: _____ ft. to _____ ft. Type _____ Size _____ Wt. of Casing: Lbs./Ft. _____

Perforated or ~~Screened~~ ☒: Ft. Bottom to Ft. 13' 1"; Ft. _____ to Ft. _____

Type of ~~Screen~~ or Perforation perforation

Date Started Jan 21 55 Date Completed Jan 25 55

Static Water Level 50' Ft.

or

Shut in Pressure _____ lbs./sq. in. Date _____

Pumping Water Level 50' Ft. at _____ 50 G P M yield.

How Tested: 10 gal. Boiler Length of Test 3 Hours.

Put Formation ☒ Log on Reverse Side

REMARKS: (Gravel Packing, Cementing, Packers, Type of Shut-off, Depth of Shut-off, Method Drilling, etc.) Cable tools 7" casing cemented at top of pit.

JAN 31 1955
RECEIVED
JAN 31 1955

TO BE MADE IN TRIPLICATE: White copy to owner, Blue copy to Colorado Water Conservation Board, and other copy to driller. ~~SOME~~

LOG OF WELL

DESCRIPTION OF MATERIAL DRILLED	METHOD OF DRILLING
---------------------------------	--------------------

Feet

00'	to 10'	Surface clay
10'	to 41'	adobe or clay some water at 41' level.
41'	to 51'	river sand + gravel block.
51'	to 61'	water gravel
	to 51'	water
61'	to	Total depth of well

50'-8" amt of 7" O.D. casing

13'-1" amt of perforation at bottom.

COLORADO WATER CONSERVATION BOARD
NOTIFICATION OF INTENTION TO DRILL ☐, REDRILL ☐,
RECASE ☐, OR DEEPEN ☐ A WATER WELL

District No. 14 Name or Number of Well Wagner Hunter
Name of Driller Alfred J. Venable Phone No. 971 M
Address 720 E 11 Salida, Colo.
Well Driller's License No. 164 Date Start of Work Jan. 21-25
Land Owner's Name Wagner Hunter Lake George, Colo.
Address Lake George Cape Lake George, Colo.
Estimated Depth of Well 60 Ft. LOCATION OF WELL
Diameter of Well 7" In. Section No. 29 County Park
Diameter of Casing 7" 60 In. Twp. 12 Range 71 P.M.
Weight of Casing 24 Lbs./Ft. Please mark well location to nearest 40 acres
(small square) below.

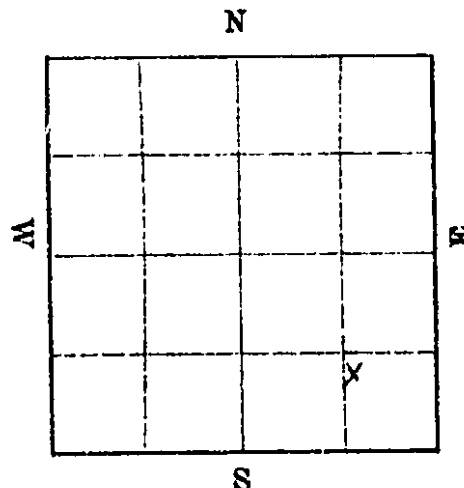
Type of Well: Domestic ☒

Irrigation ☐

Municipal ☐

Stock ☐

Other.....



Method to be used in drilling: Cable tools

If above location is unknown, complete the following:

Estimated Depth of Bottom and Top

County Park

of Shutoff.....

City, Town or Subdivision Lake George, Colo.

Type of Shutoff.....

Street Address of Well Location.....



APPENDIX D

US EPA Risk-Based Approval Letter
40 CFR 761.61(c) *Risk-based disposal approval*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8

1595 Wynkoop Street
Denver, CO 80202-1129
Phone 800-227-8917
www.epa.gov/region8

Ref: 8P-R

JUN 29 2017

Mr. Erin Connelly, Supervisor
Pike/San Isabel National Forest and Cimarron/Comanche National Grassland
United States Forest Service
2840 Kachina Drive
Pueblo, Colorado 81008

Re: Abandonment of U.S. Forest Service Water Supply Well (Old Well)
Lake George Work Center, Lake George, Colorado

Dear Mr. Connelly:

This letter is in response to your June 8, 2017 letter regarding the U.S. Forest Service's plan for grouting in-place of the Old Well at the Lake George Work Center, Colorado and for disposal of any PCB impacted sediments from the grouting process in accordance with the Toxic Substances Control Act (TSCA). The United States Environmental Protection Agency Region 8 has determined that properly grouting the well will eliminate potential PCB exposures and that any remaining PCB contaminated sediment in the abandoned well will not pose an unreasonable risk to human health and to the environment based on our review of the U.S. Forest Service's selected remedial action. The agency, hereby, approves the abandonment plan in accordance with 40 CFR 761.61(c) *Risk-based disposal approval*.

As discussed in the March 21, 2017 tele-conference call, EPA's TSCA PCB program will collaborate with our Assessment and Revitalization program for further review of the completion of this action that will be reported on the final Preliminary Assessment. Please contact Francis Tran of my staff at (303) 312-6036 if you have any further questions.

Sincerely,

Martin Hestmark
Assistant Regional Administrator
Office of Partnerships and Regulatory Assistance

cc: Kurt Muenchow, USFS
Jean Wyatt, USEPA



Printed on Recycled Paper



APPENDIX E

Well Abandonment Forms

Form No
GWS-09
03/2017

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Room 821, Denver, CO 80203 303.866.3581
www.water.state.co.us and dwrpermitsonline@state.co.us

For Office Use Only

WELL ABANDONMENT REPORT

Use to report plugging and sealing of permitted wells, monitoring and other holes. Type or print in black or blue ink. Instructions and plugging standards are on reverse side

1. Well Permit Number of plugged well _____ or MH File Number MH- _____

Owners Well Designation- LGMW-1 Receipt Number: 052418-714

2. Individual/Company responsible for plugging and sealing the well:

Name(s) Andy Horn License # _____ Auth. Individual _____

Mailing Address Applied Intellect

City, St., Zip 2801 Youngfield St. Golden, CO 80401

Phone (303) 580-3453 Email _____

3. Well (Hole) Owner: Name(s): US Forest Service, Pile San Isabelle National Forest

Phone: (303) 275-5613 Email: _____

Mailing Address, City, St., Zip: 1617 Cole Blvd. Lakewood CO 80401

4. Well Location Address: 140 Trail Creek Road, Lake George, CO

5. GPS Well Location: County Park

UTM ☐ Zone 12 or ☒ Zone 13 Easting 469386.0 Northing 4134504.0

6. Legal Location: SW 1/4 of the NE 1/4, Sec 29, Twp 12 ☐ N or S ☒ , Range 71 ☐ E or W ☒ , 6th P.M.

Distance from Section Lines _____ Ft. From ☐ N or S ☐ , _____ Ft. From ☐ E or W ☐ Line.

Subdivision Name _____ Lot _____, Block _____, Filing/Unit _____

7. I/we report the existing well/hole was plugged and sealed on _____ (date) for the following reason(s):

☐ The well was plugged and sealed as required under Well Permit Number _____.

☒ The well was not in use and was plugged and sealed.

☐ Other (please explain) _____

8. Aquifer Type: ☐ Type I (One Confining Layer) ☐ Type I (Multiple Confining Layer) ☐ Laramie-Fox Hills
(check one) ☐ Type II (Not Overlain by Type III) ☐ Type II (Overlain by Type III) ☐ Type III (alluvial)

9. Intervals of Casing Removed/Ripped:

from 3 feet to 0 feet, from _____ feet to _____ feet, from _____ feet to _____ feet,

from _____ feet to _____ feet, from _____ feet to _____ feet, from _____ feet to _____ feet,

10. Amount and Type of Material

Amount and Type of Material	Method of Placement	Interval
<u>1 50lb Bag10/20 Silica Sand</u>	<u>Poured from Surface</u>	from <u>60.5</u> feet to <u>45</u> feet
<u>2 50 lb Bags Bentonite Chips</u>	<u>Poured from Surface</u>	from <u>45</u> feet to <u>3</u> feet
<u>Native Soil</u>	<u>Backfilled</u>	from <u>3</u> feet to <u>0</u> feet
_____	_____	from _____ feet to _____ feet

I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed (or name entered if filing online) and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402.2. The filing of a document that contains false statements is a violation of section 37 91 108(1)(e), C.R.S., and is punishable by fines up to \$1,000 and/or revocation of the contracting license. If filing online the State Engineer considers the entry of the licensed contractor's name to be in compliance with Rule 17.4.

11. Signature(s)



Please Print the Name, Title, & License No.

Andy Horn

Date

07/14/2017

It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement in writing.

Form No
GWS-09
03/2017

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Room 821, Denver, CO 80203 303.866.3581
www.water.state.co.us and dwrpermitsonline@state.co.us

For Office Use Only

WELL ABANDONMENT REPORT

Use to report plugging and sealing of permitted wells, monitoring and other holes. Type or print in black or blue ink. Instructions and plugging standards are on reverse side

1. Well Permit Number of plugged well _____ or MH File Number MH- _____

Owners Well Designation- LGMW-2 Receipt Number: 052418 - AH

2. Individual/Company responsible for plugging and sealing the well:

Name(s) Andy Horn License # Auth. Individual

Mailing Address Applied Intellect

City, St., Zip 2801 Youngfield St. Golden, CO 80401

Phone (303) 580-3453 Email _____

3. Well (Hole) Owner: Name(s): US Forest Service, Pile San Isabelle National Forest

Phone: (303) 275-5613 Email: _____

Mailing Address, City, St., Zip: 1617 Cole Blvd. Lakewood CO 80401

4. Well Location Address: 140 Trail Creek Road, Lake George, CO

5. GPS Well Location: County Park

UTM ☐ Zone 12 or ☒ Zone 13 Easting 469386.0 Northing 4314514.0

6. Legal Location: SW 1/4 of the NE 1/4, Sec 29, Twp 12 ☐ N or S ☒ , Range 71 ☐ E or W ☒ , 6th P.M.

Distance from Section Lines _____ Ft. From ☐ N or S ☐ , _____ Ft. From ☐ E or W ☐ Line.

Subdivision Name _____ Lot _____, Block _____, Filing/Unit _____

7. I/we report the existing well/hole was plugged and sealed on _____ (date) for the following reason(s):

☐ The well was plugged and sealed as required under Well Permit Number _____.

☒ The well was not in use and was plugged and sealed.

☐ Other (please explain) _____

8. Aquifer Type: ☐ Type I (One Confining Layer) ☐ Type I (Multiple Confining Layer) ☐ Laramie-Fox Hills
(check one) ☐ Type II (Not Overlain by Type III) ☐ Type II (Overlain by Type III) ☐ Type III (alluvial)

9. Intervals of Casing Removed/Ripped:

from 3 feet to 0 feet, from _____ feet to _____ feet, from _____ feet to _____ feet,

from _____ feet to _____ feet, from _____ feet to _____ feet, from _____ feet to _____ feet,

10. Amount and Type of Material

Method of Placement

Interval

1 50lb Bag 10/20 Silica Sand Poured from Surface from 60.5 feet to 45 feet

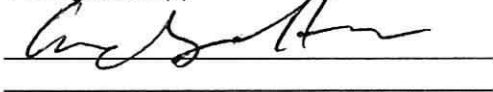
2 50 lb Bags Bentonite Chips Poured from Surface from 45 feet to 3 feet

Native Soil Backfilled from 3 feet to 0 feet

from _____ feet to _____ feet

I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed (or name entered if filing online) and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402.2. The filing of a document that contains false statements is a violation of section 37 91 108(1)(e), C.R.S., and is punishable by fines up to \$1,000 and/or revocation of the contracting license. If filing online the State Engineer considers the entry of the licensed contractor's name to be in compliance with Rule 17.4.

11. Signature(s)



Please Print the Name, Title, & License No.

Andy Horn

Date

07/14/2017

It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement in writing.

Form No GWS-09 03/2017	STATE OF COLORADO, OFFICE OF THE STATE ENGINEER 1313 Sherman St., Room 821, Denver, CO 80203 303.866.3581 www.water.state.co.us and dwrpermitsonline@state.co.us	For Office Use Only
------------------------------	--	---------------------

WELL ABANDONMENT REPORT

Use to report plugging and sealing of permitted wells, monitoring and other holes. Type or print in black or blue ink. Instructions and plugging standards are on reverse side

1. Well Permit Number of plugged well _____ or MH File Number MH- _____

Owners Well Designation- LGMW-3 Receipt Number: 052418 - 11

2. Individual/Company responsible for plugging and sealing the well:

Name(s) Andy Horn License # _____ Auth. Individual _____

Mailing Address Applied Intellect

City, St., Zip 2801 Youngfield St. Golden, CO 80401

Phone (303) 580-3453 Email _____

3. Well (Hole) Owner: Name(s): US Forest Service, Pile San Isabelle National Forest

Phone: (303) 275-5613 Email: _____

Mailing Address, City, St., Zip: 1617 Cole Blvd. Lakewood CO 80401

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UTM ☐ Zone 12 or ☒ Zone 13 Easting 169384.0 Northing 4314483.0

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Subdivision Name _____ Lot _____, Block _____, Filing/Unit _____

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☒ The well was not in use and was plugged and sealed.

☐ Other (please explain) _____

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(check one) ☐ Type II (Not Overlain by Type III) ☐ Type II (Overlain by Type III) ☐ Type III (alluvial)

9. Intervals of Casing Removed/Ripped:

from 3 feet to 0 feet, from _____ feet to _____ feet, from _____ feet to _____ feet,

from _____ feet to _____ feet, from _____ feet to _____ feet, from _____ feet to _____ feet,

10. Amount and Type of Material	Method of Placement	Interval
<u>1 50lb Bag/20 Silica Sand</u>	<u>Poured from Surface</u>	from <u>60.5</u> feet to <u>45</u> feet
<u>2 50 lb Bags Bentonite Chips</u>	<u>Poured from Surface</u>	from <u>45</u> feet to <u>3</u> feet
<u>Native Soil</u>	<u>Backfilled</u>	from <u>3</u> feet to <u>0</u> feet
_____	_____	from _____ feet to _____ feet

I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed (or name entered if filing online) and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402 2. The filing of a document that contains false statements is a violation of section 37 91 108(1)(e), C.R.S., and is punishable by fines up to \$1,000 and/or revocation of the contracting license. If filing online the State Engineer considers the entry of the licensed contractor's name to be in compliance with Rule 17.4.

11. Signature(s)	Please Print the Name, Title, & License No.	Date
	<u>Andy Horn</u>	<u>07/14/2017</u>

It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement in writing.